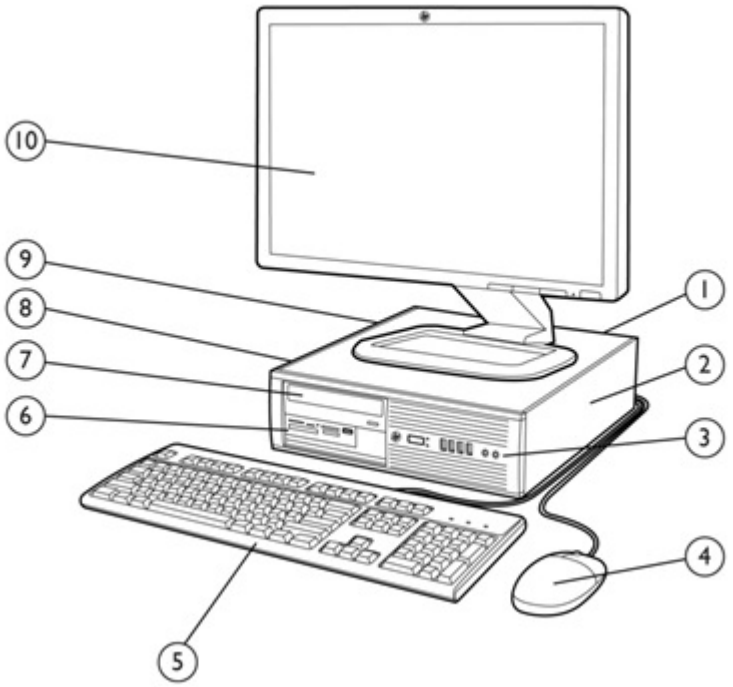
Overview



1	Rear I/O includes (4) USB 2.0 ports, serial port, PS/2 mouse and keyboard ports, RJ-45 network interface, VGA and DVI-D video interfaces, and audio in/out jacks
2	Low profile expansion slots include (2) PCI slots, (1) PCI Express x1 slot, and (1) PCI Express x16 graphics slot
3	Front I/O includes (4) USB 2.0 ports, dedicated headphone output, and a microphone jack
4	HP Optical Mouse
5	HP Keyboard
6	3.5" external drive bay supporting a media card reader
7	5.25" external drive bay supporting an optical disk drive
8	3.5" internal drive bay supporting a hard disk drive
9	240W standard efficiency or 85% high efficiency Power Supply
10	HP Monitor (sold separately)

Overview

At A Glance

- Intel® H61 Express chipset
- Intel 2nd & 3rd generation Core™ processors
- Integrated Intel HD Graphics
- Broadcom BCM 57788 Gigabit Ethernet LAN with Lightning protection
- DDR3 Synchronous Dynamic Random Access Memory (SDRAM)
- Integrated dual independent monitor support via a VGA and DVI-D video interface
- Standard efficiency, high voltage protection or 85% high efficiency energy saving power supplies available (offering will vary by geographic region)
- ENERGY STAR® qualified. EPEAT® registered where applicable/supported. See www.epeat.net for registration status by country.
- Created using industry leading Design for Environment standards
- Tailored HP Factory Express deployment and lifecycle services available (http://h71028.www7.hp.com/enterprise/cache/97688-0-0-225-121.aspx)
- Protected by HP Services, including standard warranties up to 5-5-5 (terms and conditions vary by country; certain restrictions and exclusions apply)

Standard Features and Configurable Components (availability may vary by country)

OPERATING SYSTEMS

Preinstalled

Windows 8 Pro (64-bit)*
Windows 8 (64-bit)*
Windows® 7 Ultimate (32-bit)**
Windows® 7 Ultimate (64-bit)**
Windows® 7 Professional (32-bit)**
Windows® 7 Professional (64-bit)**
Windows® 7 Professional (32-bit) (available through downgrade rights from Windows 8 Pro)***
Windows® 7 Professional (64-bit) (available through downgrade rights from Windows 8 Pro)***
Windows® 7 Home Premium (32-bit)**
Windows® 7 Home Premium (64-bit)**
Windows® 7 Home Basic (32-bit)**

FreeDOS 2.0
Novell SUSE Linux Enterprise Desktop 11

*Not all features are available in all editions of Windows 8. Systems may require upgraded and/or separately purchased hardware, drivers and/or software to take full advantage of Windows 8 functionality. See http://www.microsoft.com.

**Not all features are available in all editions of Windows 7. This system may require upgraded and/or separately purchased hardware to take full advantage of Windows 7 functionality. See http://windows.microsoft.com/en-us/windows7/products/home for details.

***This system is preinstalled with Windows® 7 Pro software and also comes with a license and media for Windows 8 Pro software. You may only use one version of the Windows software at a time. Switching between versions will require you to uninstall one version and install the other version. You must back up all data (files, photos, etc.) before uninstalling and installing operating systems to avoid loss of your data.

FreeDOS

Certified	Novell SUSE Linux Enterprise Desktop 11
Supported	Windows® 7 Enterprise Edition (32-bit or 64-bit) Windows 8 Enterprise (32-bit or 64-bit) Windows 8 Pro (32-bit) Windows 8 (32-bit)

Standard Features and Configurable Components (availability may vary by country)

PROCESSOR

Intel® 3rd Generation Core™ i7 Processors

Intel® Core™ i7-3770S with Intel HD Graphics 4000 (3.10 GHz, 8 MB cache, 4 cores)
8 threads, 65 W
Intel Stable Image Platform Program (SIPP)

Intel® 3rd Generation Core™ i5 Processors

Intel® Core™ i5-3570S with Intel HD Graphics 2500 (3.10 GHz, 6 MB cache, 4 cores)
4 threads, 65 W
Intel Stable Image Platform Program (SIPP)

Intel® Core™ i5-3475S with Intel HD Graphics 4000 (2.90 GHz, 6 MB cache, 4 cores)
4 threads, 65 W
Intel Stable Image Platform Program (SIPP)

Intel® Core™ i5-3470S with Intel HD Graphics 2500 (2.90 GHz, 6 MB cache, 4 cores)
4 threads, 65 W
Intel Stable Image Platform Program (SIPP)

Intel® 2nd Generation Core™ i3 Processors

Intel® Core™ i3-2130 with Intel HD Graphics 2000 (3.40 GHz, 3 MB cache, 2 cores)
4 threads, 65W

Intel® Core™ i3-2120 with Intel HD Graphics 2000 (3.30 GHz, 3 MB cache, 2 cores)
4 threads, 65W

Intel® Pentium® Processors

Intel® Pentium® G870 with Intel HD Graphics (3.10 GHz, 3 MB cache, 2 cores)
2 threads, 65 W

Intel® Pentium® G860 with Intel HD Graphics (3.00 GHz, 3 MB cache, 2 cores)
2 threads, 65 W

Intel® Pentium® G640 with Intel HD Graphics (2.80 GHz, 3 MB cache, 2 cores)
2 threads, 65 W

Intel® Celeron® Processors

Intel® Celeron® G550 with Intel HD Graphics (2.60 GHz, 2 MB cache, 2 cores)
2 threads, 65 W

Intel® Celeron® G540 with Intel HD Graphics (2.50 GHz, 2 MB cache, 2 cores)
2 threads, 65 W

Intel® Celeron® G460 with Intel HD Graphics (1.80 GHz, 1.5 Mb cache, 1 core)
2 threads, 65 W

CHIPSET

Intel® H61 Express

Standard Features and Configurable Components (availability may vary by country)

SMBIOS

System Management BIOS, previously known as DMI BIOS, is used to store system management information.

GRAPHICS

Integrated on all models (depends on processor)

Intel HD Graphics: Basic, 2000, 2500, 4000

NOTE: Models with Intel Core i3/i5/i7 processors include HD 2000, 2500or 4000 graphics. Models with Pentium or Celeron processors include HD graphics. Please see specific processors for graphics configuration.

Discrete

AMD Radeon HD 6350 (512 MB) PCIe x16
AMD Radeon HD 7450 (1 GB) PCIe x16
NVIDIA NVS 300 (512 MB) PCIe x16
NVIDIA NVS 310 (512 MB) PCIe x16

Adapters and Cables

HP DisplayPort to DVI-D Adapter
HP DisplayPort to HDMI Adapter
HP DisplayPort to VGA Adapter
HP DisplayPort Cable
HP DMS-59 to Dual DVI Y-Cable

STORAGE

SATA Hard Drive

250 GB, 7200 rpm, SATA 6.0 Gb/s, SMART IV
500 GB, 7200 rpm, SATA 6.0 Gb/s, SMART IV
1 TB, 7200 rpm, SATA 6.0 Gb/s, SMART IV

SATA Solid State Drive

120 GB, SATA, Solid State Drive
128 GB, SATA, Solid State Drive
256 GB, SATA, Solid State Drive

Optical Disc Drive

HP SATA DVD-ROM
HP SATA SuperMulti DVD Writer
HP SATA Blu-ray Writer
No included ODD

Media Card Reader

HP 22-in-1 (optional)

Standard Features and Configurable Components (availability may vary by country)

MEMORY

Type

Non-ECC, DDR3 SDRAM, 1600 MHz, DIMM(runs at 1333 MHz due to chipset)

Maximum

16 GB

# of Slots

2

NOTE: Full availability of 4 GB or more of memory requires a 64-bit operating system. With Windows 32-bit operating systems, the amount of usable memory is dependent upon your configuration, so that above 3 GB all memory may not be available due to system resource requirements.

NETWORKING/COMMUNICATIONS

Ethernet (RJ-45)

Integrated Broadcom BCM 57788 Gigabit Ethernet LAN with Lightning protection

Intel Pro 1000 CT2 Gigabit Ethernet Network Card (optional)

NOTE: The term "10/100/1000" or "Gigabit" Ethernet indicates compliance with IEEE standard 802.3ab for Gigabit Ethernet, and does not connote actual operating speed of 1 Gb/s. For high-speed transmission, connection to a Gigabit Ethernet server and network infrastructure is required.

Wireless

HP 802.11 b/g/n Wireless Network Card PCIe x1 (optional)

AUDIO/MULTIMEDIA

High Definition Audio with Realtek ALC221 codec (all ports are stereo)
Microphone/Headphone front ports (standard)
Line-out and Line-In rear ports (standard)
Multi-streaming capable (standard)
Internal Speaker (standard)
HP Thin USB Powered Speakers (optional)
HP USB HD 720p Business Webcam (optional)
HP Business Headset (optional)

NOTE: The audio ports/jacks provided by all HP desktop systems are 3.5mm in diameter. This would include both the front jacks and rear jacks, for audio in/out, mic in and headphone out.

Standard Features and Configurable Components (availability may vary by country)

KEYBOARDS AND POINTING DEVICES

Keyboard

HP USB Standard
HP PS/2 Standard
HP USB CCID SmartCard Keyboard
HP USB PS/2 Washable Keyboard
HP Wireless Keyboard and Mouse
(Keyboard contains 25% post-consumer recycled plastic content)

Mice

HP USB Optical Mouse
HP PS/2 Optical Mouse
HP USB Laser Mouse
HP USB PS/2 Washable Scroll Mouse

STAND

HP Small Form Factor tower stand

SECURITY

SATA Port Disablement (via BIOS)
Drive Lock
Serial, Parallel, USB enable/disable (via BIOS)
Optional USB Port Disable at factory (user configurable via BIOS)
Removable Media Write/Boot Control
Power-On Password (via BIOS)
Setup Password (via BIOS)
HP Chassis Security Kit
Support for chassis padlocks and cable lock devices

POWER

240W, 85% efficient, active PFC
240W, standard efficiency, active PFC

SOFTWARE

Included	Windows 8	Windows 7
Security	HP Client Security • Credential Manager • Password Manager • One Step Logon • Face Recognition (with optional webcam) • SpareKey • Device Access Manager w/JITA • Drive Encryption*	HP Client Security • Credential Manager • Password Manager • One Step Logon • Face Recognition (with optional webcam) • SpareKey • DigitalPass • Device Access Manager w/ JITA

Standard Features and Configurable Components (availability may vary by country)

	Computrace (user optional)** Windows Defender	• Drive Encryption (McAfee) • File Sanitizer • Privacy Manager Computrace (user optional)** Microsoft Security Essentials
Windows Applications	Internet Explorer Store Desktop Photos Mail Games Calendar People (contacts) Messaging SkyDrive Music Video Camera News Sports Weather Maps Finance Bing (Search)	Bing (Search)
Productivity	Buy Office	Buy Office
HP Additions	HP Registration HP Getting Started with Windows 8 HP ePrint*** HP Support Assistant CyberLink Media Suite Windows 8 CyberLink Media Suite CyberLink YouCam**** CyberLink YouCam Windows 8**** CyberLink Webcam Sharing Manager**** CyberLink PowerDVD SD, BD CyberLink Power2Go CyberLink Photo Director CyberLink Power Director HP Mobile Connect Evernote Skype	Corel WinDVD 10.0 SD (DVD) Player***** Corel WinDVD 10.0 BD (Blu-Ray) Player***** Roxio MyDVD Business 2010***** Roxio MyDVD Business 2010 HD***** HP Marketplace HP Wallpaper
Desktop Applications	HP Wireless Hotspot HP Support Assistant PDF Complete, corporate edition	PDF Complete Corporate Edition WinZip Basic Adobe Flash Player
HP Documentation (eDOCS)	HP eHelp Documentation HP Hardware Reference Guide HP Quick Setup & Getting Started Guide HP Regulatory and Safety Information HP Safety and Comfort Guide HP Warranty Documentation	HP eHelp Documentation HP Hardware Reference Guide HP Quick Setup & Getting Started Guide HP Regulatory and Safety Information HP Safety and Comfort Guide HP Warranty Documentation

Standard Features and Configurable Components (availability may vary by country)

HP Support Applications	HP EUDI Support Environment HP Help and Support HP Setup v9.0 HP Support Assistant	HP EUDI Support Environment HP Help and Support HP Recovery Manager HP Setup v9.0 HP Support Assistant

*Available via download
** Computrace agent is shipped turned off, and must be activated by customers when they purchase a subscription. Subscriptions can be purchased for terms ranging from one to five years. Service is limited, check with Absolute for availability outside the U.S.
*** Requires an Internet connection to HP web-enabled printer and HP ePrint account registration (for a list of eligible printers, supported documents and image types and other HP ePrint details, see www.hp.com/go/eprintcenter).Requires optional broadband module. Broadband use requires separately purchased service contract. Check with service provider for coverage and availability in your area. Separately purchased data plans or usage fees may apply. Print times and connection speeds may vary.
****Preinstalled on models with webcam
*****Optional

ENVIRONMENTAL & REGULATORY

Energy Star® qualified models available

EPEAT® registered where applicable/supported. See www.epeat.net for registration status by country.

TAA compliant

For accessibility information on HP products, please visit: http://www.hp.com/accessibility

ENVIRONMENTAL

Weight	System weight 16.72 lb 7.6 kg Shipping weight 17.86 lb 8.1 kg Maximum supported weight 77 lb 35 kg
Volume	790.26 cu in (12.95 L)
Dimensions (W x D x H)	Without stand 13.3 x 14.9 x 3.95 in 33.8 x 37.85 x 10 cm Tower stand 7.01 x 7.87 x 1.12in 178 x 20 x 2.85 cm Shipping carton 19.68 x 23.38 x 9 in 49.99 x 59.385 x 22.86 cm

Standard Features and Configurable Components (availability may vary by country)

TEMPERATURE, HUMIDITY, ALTITUDE

Temperature	Operating	50 to 95°F* 10 to 35°C*
	Non-operating	-22 to 140°F -30 to 60°C
Relative humidity	Operating	10 to 90% (non-condensing at ambient)
	Non-operating	5 to 95% (non-condensing at ambient)
Altitude (unpressurized)	Operating	0 to 10000 ft (0 to 3048 m
	Non-operating	0 to 30,000 ft (0 to 9144 m)

*Operating temperature is de-rated 1.0 deg C per 300 m (1000 ft) to 3000 m (10,000 ft) above sea level, no direct sustained sunlight. Maximum rate of change is 10 deg C/Hr. The upper limit may be limited by the type and number of options installed.

PORTS

I/O Ports – Standard

10 – USB 2.0 (4 front, 4 rear, 2 internal)
1 – Microphone in (front)
1 – Headphone jack (front)
1 – Serial RS-232 (rear)
1 – Audio line in (rear)
1 – Audio line out (rear)
2 – PS/2 (rear)
Color coded support for keyboard (purple) and mouse (green)
1 – RJ-45 (rear)
Accesses the integrated Broadcom network interface controller
1 – VGA (rear)
1 – DVI-D (rear)
Provides integrated dual independent monitor support

I/O Ports – Optional

1 – 22-in-1 media card reader
1 – Serial (via optional adapter)
1 – Parallel (via optional adapter)

Standard Features and Configurable Components (availability may vary by country)

SLOTS

1 – PCIe x16
Low-profile – 2.5”
Length 6.6”
25 W maximum power

1 PCIe x1
Low-profile – 2.5”
Length 6.6”
10 W maximum power

2 PCI
Low-profile – 2.5”
Length 6.6”
25 W maximum power

BAYS

1 – 3.5” external
Available for optional Media Card Reader

1 – 5.25” external
8.19" depth for optional optical disc drive

1 – HDD internal
Available for 3.5" hard disk drive

SERVICE AND SUPPORT

On-site Warranty[Note 1:] Three-year (3-3-3) limited warranty delivers three years of on-site, next business-day[Note 2:] service for parts and labor and includes free telephone support[Note 3:] 24 x 7. Three-year onsite and labor are not available in all countries. Service offers terms up to 5 years by choosing a Carepack. To choose the right level of service for your HP product, visit HP Care Pack Central: www.hp.com/go/cpc

NOTE 1: Terms and conditions may vary by country. Certain restrictions and exclusions apply. Other warranty variations may be offered in your region.

NOTE 2: On-site service may be provided pursuant to a service contract between HP and an authorized HP third-party provider, and is not available in certain countries. Global service response times are based on commercially reasonable best effort and may vary by country.

NOTE 3: Technical telephone support applies only to HP-configured, HP and third-party HP-qualified hardware and software. Toll-free calling and 24 x 7 support may not be available in some countries.

Technical Specifications - Graphics

Intel HD Graphics

VGA Controller	Integrated
DVI-D	Integrated
Bus Type	Intel® Flexible Display Interface (Intel® FDI) - a proprietary link for carrying display traffic from the Processor Graphics controller to the PCH display I/Os
Memory	Intel graphics do not have dedicated memory but utilizes some of the computer's system memory The amount of memory used for graphics depending on the amount of system memory installed, BIOS settings, operating system, and system load. 32 MB is pre-allocated for graphics use at system boot time. Additional memory can be allocated at boot time by the BIOS for PAVP (Protected Audio Video Playback) support for playback of protected video content. Additional memory is allocated for graphics as needed using Intel's Dynamic Video Memory Technology (DVMT), to provide an optimal balance between graphics and system memory use.
Maximum Graphics Memory	Microsoft Windows XP: Up to 1GB Microsoft Windows 7: Up to 1.7GB Windows 8: Up to 1.8GB **Note**: the actual amount of maximum graphics memory can be less than the amounts listed above depending upon your computer's configuration.
Multi-display Support	Integrated dual independent monitor support facilitated via one VGA port and one DVI-D integrated on the back plane of the system board and presented as part of the rear I/O set of interfaces. Support for DVI, HDMI, dual link DVI or second VGA monitor provided by optional HP DisplayPort adapters (see complete listing of available optional adapters elsewhere in this QuickSpec). The system can support greater than two monitors with the addition of an optional discrete graphics card. Both integrated graphics and discrete graphics can be utilized simultaneously.
HW Video Decode	AVC/VC1/MPEG2/JPEG/MJPEG/PAVP
Maximum Color Depth	32 bits/pixel

Graphics/Video API Support	3rd Generation Core processors:
	• The Processor Graphics contains a refresh of the seventh generation graphics core enabling substantial gains in performance and lower power consumption. Up to 16 EU support.
	• Next Generation Intel Clear Video Technology HD Support is a collection of video playback and enhancement features that improve the end user's viewing experience
	  ○ Encode/transcode HD content
	  ○ Playback of high definition content including Blu-ray Disc
	  ○ Superior image quality with sharper, more colorful images
	  ○ Playback of Blu-ray disc S3D content using HDMI (V.1.4 with 3D)
	• DirectX Video Acceleration (DXVA) support for accelerating video processing
	  ○ Full AVC/VC1/MPEG2 HW Decode
	• Advanced Scheduler 2.0, 1.0, XPDM support
	• Windows 7, Windows XP, OSX, Linux OS Support
	• DirectX 11, DirectX 10.1, DirectX 10, DirectX 9 support
	• OpenGL 3.3 support
	
	2nd Generation Core processors:
	• The Processor Graphics contains a refresh of the sixth generation graphics core enabling substantial gains in performance and lower power consumption.
	•

Technical Specifications - Graphics

- Next Generation Intel Clear Video Technology HD support is a collection of video playback and enhancement features that improve the end user's viewing experience.
  - Encode/transcode HD content
  - Playback of high definition content including Blu-ray Disc
  - Superior image quality with sharper, more colorful images
  - Playback of Blu-ray disc S3D content using HDMI (V.1.4 with 3D)
- DirectX Video Acceleration (DXVA) support for accelerating video processing
  - Full AVC/VC1/MPEG2 HW Decode
- Advanced Scheduler 2.0, 1.0, XPDM support
- Windows 7, XP, Windows Vista, OSX, Linux OS Support
- DirectX 10.1, DirectX 10, DirectX 9 support
- OpenGL 3.0 support

Supported Display Resolutions and Refresh Rates

NOTE: other resolutions may be available but are not recommended as they may not have been tested and qualified by HP

Resolution	Analog	Digital
640x480	85	60
800x600	85	60
1024x768	85	60
1280x720	85	60
1280x1024	85	60
1440x900	75	60
1600x1200	85	60
1680x1050	75	60
1920x1080	85	60-R
1920x1200	85	60-R
1920x1440	85	N/A
2048x1536	75	N/A
2560x1600	N/A	N/A

Note: Other resolutions may be available but are not recommended as the may not have been tested and qualified by HP
Note: 60-R denotes reduced blanking timings are used on single-link DVI connections and may be used with other digital connections

Technical Specifications - Graphics

AMD Radeon HD 6350 Graphics Card

Input/Output Connectors	DMS-59 S-	
Board Display Options	Supports two displays via included DMS-59 to dual VGA cable or 2 DVI monitors via optional DMS-59 to dual DVI cable kit part number: DL139A.	
	Specification	**Description**
Board Configuration	Graphics Chip	AMD Radeon™ HD 6350 GPU
	Core clock	650 MHz
	Memory clock	800 MHz
	Frame buffer	512 MB DDR3, 64 bit wide
Bus Type	PCI Express x16 Generation 2.0	
Max. Vertical Refresh	85Hz	
Display Support	Integrated 400MHz RAMDAC	
RAMDAC	400MHz DAC, 10-bit per channel	
Display Max. Resolution	Digital 1920 x 1200 Analog 2048 x 1536	

Display Resolutions and Refresh Rates

NOTE: other resolutions may be available but are not recommended as they may not have been tested and qualified by HP

Resolution	**Maximum Refresh Rate (Hz)**	
	Analog	**Digital**
640 x 480	85	60
800 x 600	85	60
1024 x 768	85	60
1280 x 720	85	60
1280 x 1024	85	60
1440 x 900	75	60
1600 x 1200	85	60
1680 x 1050	75	60
1920 x 1080	85	60-R
1920 x 1200	85	60-R
1920 x 1440	85	N/A
2048 x 1536	75	N/A
2560 x 1600	N/A	N/A

* Only supported with a Display Port monitor connection
** Only supported when using a dual link DVI or DP monitor connection.
Note: 60-R denotes reduced blanking timings are used on single link DVI connections and may be sued with other digital connections.

Technical Specifications - Graphics

Languages supported	24 languages: English, Arabic, Chinese Simplified, Chinese Traditional, Czechoslovakian, Danish, Dutch, Finnish, French, German, Greek, Hebrew, Hungarian, Italian, Japanese, Korean, Norwegian, Polish, Portuguese, Russian, Spanish, Swedish, Thai, Turkish.
Operating systems support	Windows 7 Home Basic*, Windows 7 Home Premium*, Windows 7 Professional Edition 32*, Windows 7 Professional Edition 64*, Windows 7 Ultimate Edition 32*, Windows 7 Ultimate Edition 64*, Windows Vista Ultimate 32†, Windows Vista Ultimate 64†, Windows Vista Business 32†, Windows Vista Business 64†, Windows Vista Home Basic 32†, Windows Vista Home Basic 64†, Windows XP Professional or Windows XP Home 32†. *This system may require upgraded and/or separately purchased hardware and/or a DVD drive to install the Windows 7 software and take full advantage of Windows 7 functionality. See http://www.microsoft.com/windows/windows-7/ for details. Windows 7 Business disk may be included for future upgrade if desired. To qualify for this downgrade an end user must be a business (including governmental or educational institutions) and is expected to order at least 25 customer systems with the same custom image † Certain Windows Vista product features require advanced or additional hardware. Windows Vista Upgrade Advisor can help you determine which features of Windows Vista will run on your computer. To download the tool, visit: http://www.windowsvista.com/upgradeadvisor. For Windows Vista system requirements, visit: http://www.windowsvista.com/systemrequirements. Linux x86 and x86_64 distributions using XFree86 or X.Org‡. ‡Linux drivers are available from ATI's website and may be available in a Linux distribution. Refer to the Open Source and Linux from HP website: http://www.hp.com/wwsolutions/linux/products/clients/ for support information.
Maximum Power Consumption	19.9 W
Option kit contents	• AMD Radeon HD 6350 (512MB) DH PCIe x16 Card with full height bracket attached • DMS 59 to dual VGA Y cable • Software CD with graphics drivers • Low profile bracket to convert the card for using in a low profile chassis • Warranty documentation

Technical Specifications - Graphics

AMD Radeon HD 7450 DF Graphics Card

Input/Output Connectors	One Dual link DVII and one DisplayPort output.	
Board Configuration	**Specification**	**Description**
	Graphics Chip	AMD Radeon™ HD 7450 GPU (Based on AMD Radeon™ HD 6000 series GPU technology)
	Core clock	625 MHz
	Core clock	800 MHz
	Frame buffer	1GB MB DDR3, 64 bit wide
Bus Type	PCI Express x16 Generation 2.0	
Max. Vertical Refresh	85Hz	
Display Support	Integrated 400MHz RAMDAC	
RAMDAC	400MHz DAC, 10-bit per channel	
Display Max. Resolution	Digital 1920 x 1200 Analog 2048 x 1536	

Display Resolutions and Refresh Rates

NOTE: other resolutions may be available but are not recommended as they may not have been tested and qualified by HP

Resolution	**Maximum Refresh Rate (Hz)**	
	Analog	**Digital**
640 x 480	85	60
800 x 600	85	60
1024 x 768	85	60
1280 x 720	85	60
1280 x 1024	85	60
1440 x 900	75	60
1600 x 1200	85	60
1680 x 1050	75	60
1920 x 1080	85	60-R
1920 x 1200	85	60-R
1920 x 1440	85	60*
2048 x 1536	75	60*
2560 x 1600	N/A	60**

* Only supported with a Display Port monitor connection
** Only supported when using a dual link DVI or DP monitor connection.
Note: 60-R denotes reduced blanking timings are used on single link DVI connections and may be sued with other digital connections.

Technical Specifications - Graphics

Languages supported	24 languages: English, Arabic, Chinese Simplified, Chinese Traditional, Czechoslovakian, Danish, Dutch, Finnish, French, German, Greek, Hebrew, Hungarian, Italian, Japanese, Korean, Norwegian, Polish, Portuguese, Russian, Spanish, Swedish, Thai, Turkish
Operating systems support	Windows 7 Home Basic*, Windows 7 Home Premium*, Windows 7 Professional Edition 32*, Windows 7 Professional Edition 64*, Windows 7 Ultimate Edition 32*, Windows 7 Ultimate Edition 64*, Windows Vista Ultimate 32†, Windows Vista Ultimate 64†, Windows Vista Business 32†, Windows Vista Business 64†, Windows Vista Home Basic 32†, Windows Vista Home Basic 64†, Windows XP Professional or Windows XP Home 32†. *This system may require upgraded and/or separately purchased hardware and/or a DVD drive to install the Windows 7 software and take full advantage of Windows 7 functionality. See http://www.microsoft.com/windows/windows-7/ for details. Windows 7 Business disk may be included for future upgrade if desired. To qualify for this downgrade an end user must be a business (including governmental or educational institutions) and is expected to order at least 25 customer systems with the same custom image † Certain Windows Vista product features require advanced or additional hardware. Windows Vista Upgrade Advisor can help you determine which features of Windows Vista will run on your computer. To download the tool, visit: http://www.windowsvista.com/upgradeadvisor. For Windows Vista system requirements, visit: http://www.windowsvista.com/systemrequirements. Linux x86 and x86_64 distributions using XFree86 or X.Org‡. ‡Linux drivers are available from ATI's website and may be available in a Linux distribution. Refer to the Open Source and Linux from HP website: http://www.hp.com/wwsolutions/linux/products/clients/ for support information.
Option kit contents	• AMD Radeon HD 7450 DP (1GB) PCIe x16 Card with full height bracket attached • DVII to VGA adapter • Software CD with graphics drivers • Low profile bracket to convert the card for using in a low profile chassis • Warranty documentation
Compliance standards	EMC Emissions: a) FCC Part 15, Subpart B – Unintentional Radiators, Class B Computing Devices for Home & Office Use b) CISPR22: 1997/EN 55022:1998 – Class B – Limits and methods of measurement of radio disturbance characteristics of Information Technology Equipment c) Canadian Standard ICES-003 is equivalent to CISPR22 d) Taiwanese Standard BSMI e) Japanese VCCI f) Australian C-Tick g) Korean (KCC) EMC Immunity: CISPR 24:1997/EN 55024:1998 - Information Technology Equipment – Immunity Characteristics – Limits and Methods of Measurement.
RAMDAC	400MHz DAC, 10-bit per channel
Display Max. Resolution	Digital 1920 x 1200 Analog 2048 x 1536

Technical Specifications - Graphics

NVIDIA NVS 300 Graphics Card

Introduction
The NVIDIA NVS 300 PCIe Graphics Card is a low profile, dual-head graphics card delivering next-generation multi-display capabilities to professional business and commercial applications.

If you require a graphics card for use with desktops in a telesales-center environment, or frequently analyze spreadsheets requiring the flexibility of dual-monitor displays, the NVIDIA NVS 300 PCIe Graphics Card is the ideal solution for you. Easily installed with a setup wizard, this controller integrates seamlessly with the Microsoft Windows environment. nView - NVIDIAs multi-display software, enhances your productivity in single or multi-display environments by allowing you to take advantage of features like gridlines & Virtual Desktops (Virtual Desktops allows an end user to create up to 32 individual desktops)

The NVIDIA NVS 300 PCIe Graphics Card is also GPU computing ready. It is capable of enhancing system performance if used in conjunction with applications that support GPU computing through DirectCompute, CUDA, or OpenCL frameworks.

The NVIDIA NVS 300 PCIe Graphics Card includes 512MB of DDR3 graphics memory. A minimum system memory configuration of 1GB is needed to support this card.

NOTE: Graphics cards use part of the total system memory (RAM) for graphics performance. System memory dedicated to graphics performance is not available for other use by other programs.

Key Benefits

- View your work on two monitors with nView multi-display software and create up to 32 individual desktops (using 'Virtual Desktops' with nView)
- Compatible with all major financial, non-linear editing (NLE), and electronic design automation (EDA) applications
- Includes 512 MB of dedicated DDR3 graphics memory
- Deliver crystal-clear images via dual 400-MHz RAMDACs
- Supports the latest flat-panel displays, dual analog or digital displays
- Robust IT management tools for seamless installation, deployment and maintenance
- Passive heatsink for silent operation
- DirectX 10.1 support in hardware for optimal performance in DX10 applications
- OpenGL 3.3 support in hardware for optimal performance with OpenGL applications

Form Factor	PCI Express x16 (generation 2.0) Low Profile, half length, 2.586" x 5.7" (6.57 x 14.48 cm) Full height bracket utilized when configured to MT
Graphics Controller	Nvidia GT218 GPU
Memory Frame Buffer	512MB DDR3, 64-bit wide
Output Connectors	Single DMS-59 connector Supports dual analog displays with included DMS-59 to dual VGA Y cable. Support dual digital displays with an optional adapter (see complete listing of available optional adapters elsewhere in this QuickSpec).
RAMDAC	Dual 400MHz
Core Clock	520MHz
Memory Clock	790MHz
Frame Buffer	512MB DDR2, 64-bit wide
Maximum Pixel Clock (analog)	400MHz
Overlay planes	One 16-bit video overly plane
Video Acceleration	Directx 10.1; OpenGL 3.3; CUDA, DirectCompute

Technical Specifications - Graphics

	Full screen, full frame video playback of HDTV, Blu-ray and DVD content
High-definition Video Processor (HDVP)	Inbuilt video decoder for multiple video formats including MPEG2, VC-1, WMV9, H.264, and MVC Capable of decoding dual Video Streams at HD (1080p) resolutions Hardware color-space conversion (YUV 4:2:2 and 4:2:0) High-Quality in-built Filtering/Scaling Stereo & HD Audio (LPCM 7.1) support for HDMI outputs (HDMI via optional DVI-HDMI dongles) with the DMS-59 to DisplayPort Adapter
Supported Graphics APIs	OpenGL 3.3 support in hardware DirectX 10.0 support in hardware

Display Resolutions and Refresh Rates

Note: other resolutions may be available but are not recommended as they may not have been tested and qualified by HP

Resolution	Maximum Refresh Rate (Hz)	
	Analog	Digital
640 x 480	85	60
800 x 600	85	60
1024 x 768	85	60
1280 x 720	85	60
1280 x 1024	85	60
1440 x 900	75	60
1600 x 1200	85	60
1680 x 1050	75	60
1920 x 1080	85	60-R
1920 x 1200	85	60-R
1920 x 1440	85	N/A
2048 x 1536	75	N/A

Note: 60-R denotes reduced blanking timings are used on single link DVI connections and may be used with other digital connections.

NVIDIA NVS 310 Graphics Card

Introduction

The NVIDIA® NVS™ 310 Graphics Card is a PCI Express low profile form factor graphics add-in card targeted as an active low cost graphics solution for the corporate business and enterprise markets.

The NVIDIA® NVS 310 graphics card is an ideal solution for customers requiring a small form factor graphics add-in card for either standard or small form factor PC designs.

Performance and Features

The NVIDIA® NVS 310 Graphics Card offers 512 MB of ultrafast DDR3 memory and is capable of supporting up to 2 displays.

- DisplayPort connector supports multimode technology to support connection to DVI-D, VGA and HDMI monitors with optional adapters in kits NR078AA, FH973AT, BP937AA, AS615AA.
- For a DisplayPort to DisplayPort connections use the optional DisplayPort Cable Kit VN567AA.

Form Factor (H x L)	Low Profile: 2.713 × 6.15 in
Bus Type	PCI Express x16, 2.0 compliant

Technical Specifications - Graphics

Graphics Controller	NVIDIA® NVS 310
Memory Size	512 MB DDR3
Memory Clock	875MHz
Memory Bandwidth	14 GB/s
Connectors	2 x DisplayPort 1.2
Maximum Resolution	Up to 2560 x 1600 (digital display) per display.
Display Output	Up to 2 displays in the following configurations DisplayPort output: • Drives two DisplayPort enabled digital display at resolutions up to 2560 × 1600 at 60 Hz with reduced blanking, when connected natively using the 2 DisplayPort connectors on the NVS 310 graphics card • Supports 2 monitors up to resolution of 1920 × 1200 at 60 Hz with reduced blanking using DisplayPort 1.2 multi stream topology technology. DVI-D output: • Drives two digital display at resolutions up to 1920 × 1200 at 60 Hz with reduced blanking using DisplayPort to DVI-D single-link cable adaptors • Drives two digital display at resolutions up to 2560× 1600 at 60 Hz with reduced blanking using DisplayPort to DVI-D dual-link cable adaptors HDMI output: • NVS 310 is capable of driving two high definition (HD) panels up to resolutions of 1920 × 1080P at 60 Hz using DisplayPort to HDMI cable adaptors VGA display output: • Drives two analog display at resolutions up to 1920 × 1200 at 60 Hz using DisplayPort to VGA cable adaptors
Max. Power	19.5 W

Display Resolutions and Refresh Rates

Note: other resolutions may be available but are not recommended as they may not have been tested and qualified by HP

Resolution	Maximum Refresh Rates (Hz) by Connection			
	DisplayPort to VGA	DisplayPort to DVI-D	DisplayPort to HDMI	DisplayPort
640 x 480	85	60	60	60
800 x 600	85	60	60	60
1024 x 768	85	60	60	60
1280 x 720	85	60	60	60
1280 x 1024	85	60	60	60
1440 x 900	75	60	60	60
1600 x 1200	60	60	60	60
1680 x 1050	60	60	60	60
1920 x 1080	60-R	60-R	60	60
1920 x 1200	60-R	60-R		60
1920 x 1440				60
2048 x 1536				60
2560 x 1600				60

Technical Specifications - Graphics

Note: 60-R denotes reduced blanking timings are used on single link DVI connections and may be used with other digital connections.

Introduction:

HP Serial Advanced Technology Attachment (SATA) Hard Drives maximize the performance of HP Business PCs by providing the technologies to meet your increasing storage demands with high-capacity drives offering superior reliability and performance.

SATA provides faster data transfer speeds, better system cooling airflow, more bandwidth, more headroom for speed increases in future generations and better data integrity. A next-generation technology, the SATA interface connects hard drives to the PC platform enabling easy aggregation of multiple hard drives into a single PC. This offers you the additional benefits of dedicated bandwidth, the ability to more easily identify device failures and scalability. The HP Compaq Pro 4300 Series supports the latest SATA 6.0 Gb/s specification.

HP Drive Lock

HP Serial ATA Hard Drives offer enhanced security via a new Drive Lock. When enabled, this ATA security feature set prevents software access to user data on the drive until one or two user-defined passwords are provided.

SMART IV Technology

Self Monitoring Analysis and Reporting Technology (SMART) hard drive technology allows hard drives to monitor their own health and to raise flags if imminent failures are predicted. If the drive determines that a failure is imminent, the SMART hard drive technology enables the intelligent manageability or management software to generate a fault alert. While the current versions of SMART hard drives do a good job monitoring the data on the hard drive media, the ever increasing emphasis on reliability and quality has promoted HP to implement SMART IV technology which constantly checks that the data flow from host interface to media and media to host interface is not compromised. This is accomplished by inserting a 2 byte parity code into every 512 byte block in the data path of the hard drive's Cache RAM. This unique parity checking performed by HP's SMART IV technology hard drives, allows for more complete error detection coverage encompassing the entire data path between the host and the hard drive.

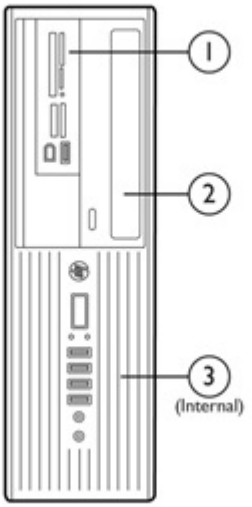
Smart IV is also known as IOEDC: I/O Error Detection Code.

Native Command Queuing

NCQ or Native Command Queuing is a SATA protocol extension that allows the hard drive to have several write or read commands outstanding at the same time. In contrast, normal non-queued operation requires each command to be completed before the next command is issued by the host system. Queuing allows the drive to complete the commands in the order that allows for best overall throughput. It also involves an advanced method of transferring data to or from the host, called First Party Direct Memory Access (FPDMA), which allows the hard drive and the host controller to manage the data transfers for multiple outstanding commands, without involving the host processor. NCQ can contribute to better performance but the results are dependent on many factors, including the access patterns of the various applications and operating system functions that are initiating drive accesses. Enabling NCQ features in the hard drive requires AHCI support from the host system BIOS, controller, and driver. AHCI support is typically implemented in RAID configurations.

Note: GB = 1 billion bytes. Actual available capacity is less.

Technical Specifications – Hard Disk and Solid State Storage



Storage Drive Support			
	Media Card Reader	Media Card Reader	Hard Disk Drive
Quantity Supported	1	1	1
Position	1	2	3

Controller

Hard Drive Controller	Serial ATA (SATA) 3.0 Supports up to 6.0 Gb/s
SATA Interfaces	2 total
Host SATA Controller	Advanced Host Controller Interface (AHCI) Revision 1.2. The specification includes a description of the hardware/software interface between system software and the host controller hardware.

Technical Specifications – Hard Disk and Solid State Storage

HP 250-GB 7200rpm SATA 6.0Gb/s 3.5” Hard Disk Drive

Capacity	250,059,350,016 bytes
Rotational Speed	7,200 rpm
Interface	Serial ATA 3.0 (6.0 Gb/s)
Buffer Size	8 MB
Logical Blocks	488,397,168
Seek Time (typical reads, includes controller overhead, including settling)	**Single Track:** 1.0 ms **Average:** 8.5 ms **Full-Stroke:** 18 ms
Height (nominal)	1 in (2.54 cm)
Width (nominal)	Media diameter: 3.5 in (8.89 cm) Physical size: 4 in (10.2 cm)
Operating Temperature	41° to 131° F (5° to 55° C)

HP 500-GB 7.2K rpm SATA 6.0Gb/s 3.5” Hard Disk Drive

Capacity	500,107,862,016 bytes
Rotational Speed	7,200 rpm
Interface	Serial ATA 3.0 (6.0 Gb/s)
Buffer Size	16 MB
Logical Blocks	976,773,168
Seek Time (typical reads, includes controller overhead, including settling)	**Single Track:** 2.0 ms **Average:** 11 ms **Full-Stroke:** 21 ms
Height (nominal)	1 in/2.54 cm
Width (nominal)	Media diameter: 3.5 in/8.89 cm Physical size: 4 in/10.2 cm
Operating Temperature	41° to 131° F (5° to 55° C)

Technical Specifications – Hard Disk and Solid State Storage

HP 1-TB 7.2K rpm SATA 6.0Gb/s 3.5” Hard Disk Drive

Capacity	1,000,204,886,016 bytes
Rotational Speed	7,200 rpm
Interface	Serial ATA 3.0 (6.0 Gb/s)
Buffer Size	32 MB
Logical Blocks	1,953,525,168
Seek Time (typical reads, includes controller overhead, including settling)	**Single Track:** 2.0 ms **Average:** 11 ms **Full-Stroke:** 21 ms
Height (nominal)	1 in/2.54 cm
Width (nominal)	Media diameter: 3.5 in/8.89 cm Physical size: 4 in/10.2 cm
Operating Temperature	41° to 131° F (5° to 55° C)

HP 120-GB Solid State Drive

Unformatted Capacity	120 GB
Architecture	Multi Level Cell (MLC) NAND Flash with wear leveling 10 channel controller
Interface	Serial ATA 2.0 (3.0 Gb/s)
Dimensions (W x H x D)	2.74 x 0.37 x 4 in/6.98 x 0.95 x 10.2 cm
Weight	0.18 lb/80 g
Bandwidth Performance	**Sustained Sequential Read:** Up to 250 MB/s **Sustained Sequential Write:** Up to 70 MB/s **Random Read:** Up to 35K IOPs **Random Write:** Up to 6.6K IOPs
Latency	**Read:** 65-ms **Write:** 85-ms
Power	**DC power requirement:** 5 VDC 5%-100 mV ripple p-p **Total power consumption:** 0.15W (active); 0.075W (idle)
Useful Drive Life	35TB written, up to 20GB/day for 5 years
Environmental (all conditions, non-condensing)	**Operating Temperature:** 32° to 158° F (0° to 70° C) **Relative Humidity:** 5% to 95% **Maximum Wet Bulb Temperature** (operating): 84° F (29° C) **Shock:** 1,500 G/0.5-ms

HP Blu-ray Writer Drive

AMO Part Number	AR482AA		
Height	5.25-inch, half-height, tray-load		
Orientation	Either horizontal or vertical		
Interface type	SATA		
Disc capacity	50 GB DL or 25 GB standard		
Dimensions (W x H x D)	5.9 x 1.7 x 8.0 in (15.0 x 4.4 x 19.0 cm)		
Weight (max)	2.0 lb (907 g)		
Disc Capacity	**DVD-ROM**	8.5GB DL or 4.7GB standard	
	Blu-ray	50GB DL or 25GB standard	
	Full Stroke DVD	< 250 ms (seek)	
	Full Stroke CD	< 210 ms (seek)	
	Blu-ray	< 275 ms (seek)	
	Startup Time	(Time to drive ready from tray loading)	
		BD-ROM (SL/DL)	25S / 28S
		BD-R (SL/DL)	25S / 28S
		BD-RE (SL/DL)	25S / 28S
		DVD-ROM (SL/DL)	18S / 18S
		DVD-R (SL/DL)	25S / 25S
		DVD-RW	25S
		DVD+R (SL/DL)	25S / 25S
		DVD+RW	DVD+RW 25S
		DVD-RAM	45S
		CD-ROM	15S
	CD-ROM Read	CD-ROM up to 40X	
		CD-R up to 40X	
		CD-RW up to 40X	
	DVD-ROM Read	DVD-RAM up to 5X	
		DVD+RW up to 10X	
		DVD-RW up to 10X	

Technical Specifications - Removable Storage

Maximum Data Transfer Rates		DVD+R DL up to 8X
		DVD-R DL up to 8X
		DVD-ROM up to 16X
		DVD-ROM DL up to 8X
		DVD+R up to 12X
		DVD-R up to 12X
	Blu-ray	BD-ROM up to 6X
		BD-ROM DL up to 4.8X
		BD-R up to 6X
		BD-R DL up to 4.8X
		BD-R up to 6X
		BD-RE SL/DL up to 4.8X
Power	**Source**	SATA DC power receptacle
	DC Power Requirement	5 VDC ± 5%-100 mV ripple p-p 12 VDC ± 5%-200 mV ripple p-p
	DC Current	5 VDC -1000 mA typical, 1600 mA maximum 12 VDC -600 mA typical, 1400 mA maximum
	Temperature (operating)	41° to 122° F (5° to 50° C)
Environmental (all conditions non-condensing)	**Relative Humidity** (operating)	10% to 90%
	Maximum Wet Bulb Temperature (operating)	86° F (30° C)

HP SuperMulti DVD Writer Drive

AMO Part Number	AR630AT
Height	5.25-inch, half-height, tray-load
Orientation	Either horizontal or vertical
Interface type	Serial ATA
Dimensions (W x H x D)	5.9 x 1.7 x 8.0 in (15.0 x 4.4 x 20.3 cm)
Weight (max)	2.6 lb (1.2 kg)

CD Media Read Access	Random	< 120 ms typical
	Full Stroke	< 200 ms typical
DVD Media Read Access	Random	< 130 ms typical
	Full Stroke	< 240 ms typical
	CD-ROM, CD-R Read	Up to 6000 KB/s (40X)
	CD-RW Read	Up to 4800 KB/s (32X)

Technical Specifications - Removable Storage

Performance	CD Media Read Transfer	Digital/Analog Audio Playback	Up to 2400 KB/s (16X)
		Digital Audio Extraction (CD-ROM, CD-R)	Up to 6000 KB/s (40X)
		Digital Audio Extraction (CD-RW)	Up to 4800 KB/s (32X)
		Video CD Playback	Up to 2400 KB/s (16X)
	DVD Media Read Transfer	DVD-ROM SL Read	Up to 21600 KB/s (16X)
		DVD-ROM DL Read	Up to 10800 KB/s (8X)
		DVD Video Playback	Up to 10800 KB/s (8X)
		DVD Video SL (other than playback)	Up to 21600 KB/s (16X)
		DVD Video DL (other than playback)	Up to 10800 KB/s (8X)
		DVD-R	Up to 21600 KB/s (16X)
		DVD+R	Up to 21600 KB/s (16X)
		DVD-RW	Up to 10800 KB/s (8X)
		DVD-R DL	Up to 10800 KB/s (8X)
		DVD+RW	Up to 10800 KB/s (8X)
	CD Media Write Transfer	CD-R Write	Up to 6000 KB/s (40X)
		CD-RW	600 KB/s (4X)
		CD-RW (High speed)	1500 KB/s (10X)
		CD-RW (Ultra speed)	Up to 3600 KB/s (24X)
		CD-RW (Ultra speed+)	Up to 4800 KB/s (32X)
	DVD Media Write Transfer	DVD+R	Up to 21600 KB/s (16X)
		DVD+R DL (v1.2)	Up to 16200 KB/s (12X)
		DVD+R DL (v1.1)	Up to 10800 KB/s (8X)
		DVD+RW (Volume 2 v1.0)	Up to 10800 KB/s (8X)
		DVD+RW (Volume 1 v1.3)	Up to 5400 KB/s (4X)
		DVD-R (v2.1 rev. 6.0)	Up to 16200 KB/s (12X)
		DVD-R (v2.1 rev. 4.0)	Up to 21600 KB/s (16X)
		DVD-R DL (v3.0 rev. 5.0)	Up to 10800 KB/s (8X)
		DVD-R DL (v3.0 rev. 3.0)	Up to 10800 KB/s (8X)
		DVD-RW (v1.2 rev. 3.0)	8100 KB/s (6X)
		DVD-RW (v1.2 rev. 2.0)	Up to 5400 KB/s (4X)
		DVD-RAM (v2.2 rev. 5.0)	Up to 16200 KB/s (12X)
		DVD-RAM (v2.2 rev. 2.0)	Up to 6750 KB/s (5X)

Media	Read	Write
CD-ROM	Yes	No
CD-R	Yes	No
CD-RW	Yes	No
DVD-ROM	Yes	No
DVD-ROM DL	Yes	No

Technical Specifications - Removable Storage

Media Compatibility	DVD-RAM	Yes	No
	DVD+R	Yes	No
	DVD+R DL	Yes	No
	DVD+RW	Yes	No
	DVD-R	Yes	No
	DVD-RW	Yes	No
	DVD-R DL	Yes	No
Power Supply	Source	SATA DC power receptacle	
	DC Power Requirement	5 VDC ± 5%	100 mV ripple p-p
		12 VDC ± 5%	200 mV ripple p-p
	DC Current	5 VDC	<1000 mA (typical) 1600 mA (max.)
		12 VDC	1200 mA (typical) 2000 mA (max.)
		Total Drive Power (Standby Mode)	< 2.5W
Rear Panel	SATA Power Connector, 15-pin SATA Data Connector, 7-pin Markings to identify each connector		
Environmental conditions (all conditions non-condensing)	Operating Temperature	41° to 122° F (5° to 50° C)	
	Storage Temperature	–22° F to 140° F (–30° C to 60° C)	
	Relative Humidity	10% to 90%	
	Maximum Wet Bulb Temperature	86° F (30° C)	
	Altitude	0 to 10,171 ft. (0 to 3,100 meters)	

HP DVD-ROM Drive

AMO Part Number	AR629AA		
Height	5.25-inch, half-height, tray-load		
Orientation	Either horizontal or vertical		
Interface type	Serial ATA		
Dimensions (W x H x D)	5.8 x 1.7 x 6.9 in (14.8 x 4.2 x 17.5 cm)		
Weight (max)	2.1 lb (950 kg)		
	CD Media Read Access	Random	< 120 ms typical
		Full Stroke	< 200 ms typical
	DVD Media Read Access	Random	< 130 ms typical
		Full Stroke	< 240 ms typical
	CD Media Read Transfer	CD-ROM, CD-R Read	Up to 6000 KB/s (40X)
		CD-RW Read	Up to 4800 KB/s (32X)
		Digital/Analog Audio Playback	Up to 2400 KB/s (16X)
		Digital Audio Extraction (CD-ROM, CD-R)	Up to 6000 KB/s (40X)

Technical Specifications - Removable Storage

Performance	DVD Media Read Transfer	Digital Audio Extraction (CD-RW)	Up to 4800 KB/s (32X)
		Video CD Playback	Up to 2400 KB/s (16X)
		DVD-ROM SL Read	Up to 21600 KB/s (16X)
		DVD-ROM DL Read	Up to 10800 KB/s (8X)
		DVD Video Playback	Up to 10800 KB/s (8X)
		DVD Video SL (other than playback)	Up to 21600 KB/s (16X)
		DVD Video DL (other than playback)	Up to 10800 KB/s (8X)
		DVD-R	Up to 21600 KB/s (16X)
		DVD+R	Up to 21600 KB/s (16X)
		DVD-RW	Up to 10800 KB/s (8X)
		DVD-R DL	Up to 10800 KB/s (8X)
		DVD+RW	Up to 10800 KB/s (8X)
Media Compatibility	**Media**	**Read**	**Write**
	CD-ROM	Yes	No
	CD-R	Yes	No
	CD-RW	Yes	No
	DVD-ROM	Yes	No
	DVD-ROM DL	Yes	No
	DVD-RAM	Yes	No
	DVD+R	Yes	No
	DVD+R DL	Yes	No
	DVD+RW	Yes	No
	DVD-R	Yes	No
	DVD-RW	Yes	No
	DVD-R DL	Yes	No
Power Supply	Source	SATA DC power receptacle	
	DC Power Requirement	5 VDC ± 5%	100 mV ripple p-p
		12 VDC ± 5%	200 mV ripple p-p
	DC Current	5 VDC	1000 mA (typical) 1600 mA (max.)
		12 VDC	1200 mA (typical) 2000 mA (max.)
		Total Drive Power (Standby Mode)	< 2.5W
Rear Panel	SATA Power Connector, 15-pin SATA Data Connector, 7-pin Markings to identify each connector		
Environmental conditions (all conditions	Operating Temperature	41° to 122° F (5° to 50° C)	
	Storage Temperature	–22° F to 140° F (–30° C to 60° C)	
	Relative Humidity	10% to 90%	

(all conditions non-condensing)	Maximum Wet Bulb Temperature	86° F (30° C)
	Altitude	0 to 10,171 ft. (0 to 3,100 meters)

HP 22-n-1 Media Card Reader

	USB 2.0 High-speed interface
USB Interface	**Note:** Requires the USB cable to be connected to the internal USB 2.0 port or a USB 2.0 PCI card.
Advance protocol support	Supports hardware ECC (Error Correction Code) function
	Supports hardware CRC (Cyclic Redundancy Check) function
	Supports MS 4-bit parallel transfer mode
	Supports MS-PRO 4-bit parallel transfer mode
	Supports MS PRO-HG Duo 4-bit parallel transfer mode
	Supports SD 4-bit parallel transfer mode
	Supports high-speed 50Mhz SD 4-bit card (version 2.0)
	Supports high-speed 52Mhz MultiMediaCard 8-bit card (version 4.2)
	Supports CF v4.0 with PIO mode 6 and Ultra DMA mode
Supported media type	CompactFlash Type I
	CompactFlash Type II
	Microdrive
	MultiMediaCard
	Reduced Size MultiMediaCard (RS MultiMediaCard)
	MultiMediaCard 4.2 (MultiMediaCard Plus, including MultiMediaCard Plus HC)
	Reduced Size MultiMediaCard 4.2 (MultiMediaCard Mobile, including MultiMediaCard Mobile HC)
	Secure Digital Card (SD)
	Secure Digital High Capacity (SDHC)
	miniSD
	miniSD High Capacity
	Micro SD (T-Flash)
	Micro SD HC
	Memory Stick
	Memory Stick Select

Technical Specifications - Removable Storage

Supported media type with card adapter	Memory Stick Duo (MS Duo)	
	Memory Stick PRO (MS PRO)	
	Memory Stick PRO Duo (MS PRO Duo)	
	Memory Stick PRO-HG Duo	
	MagicGate Memory Stick (MG)	
	MagicGate Memory Stick Duo	
	Picture Card	
	Memory Stick Micro (M2)	
	MultiMediaCard Micro	
Environmental	Operational Environmental Extremes	Test Parameters/Conditions - Power applied, unit operating on system ±5% nominal supply voltage. 10°C 10% R.H. ≤ 24 hours 10°C 90% R.H. ≤ 24 hours 20°C 90% R.H. ≤ 24 hours 30°C 90% R.H. ≤ 24 hours 40°C 90% R.H. ≤ 24 hours 50°C 90% R.H. ≤ 24 hours 50°C 10% R.H. ≤ 24 hours
	Storage Environmental Extremes	Test Parameters/Conditions 140°F (60°C) @ 80% R.H. for 96 hours –22°F (–30°C) @ 20% R.H. for 48 hours No power applied Delta °C < 1.0°C/min Delta % R.H. < 1.5% R.H./min
Approvals	USB-IF, WHQL, Compliant with USB Mass Storage Class Bulk only Transport Specification Rev. 1.0	
	Compliant Intel Front Panel I/O Connectivity Design Guide V. 1.3	
	FCC, CE, BSMI, C-Tick, VCCI, MIC, cUL, TUV-T	

System Memory Support

Memory upgrades are accomplished by adding single or multiple DIMMs of the same or varied sizes. This chart does not represent all possible memory configurations. The HP Compaq Pro 4300 Series PC supports non-ECC DDR3 memory with a data rate of 1600 MHz (limited to 1333 MHz due to chipset)

CAUTION: You must shut down the computer and disconnect the power cord before adding or removing memory modules. Regardless of the power-on state, voltage is always supplied to the memory modules as long as the computer is plugged in to an active AC outlet. Adding or removing memory modules while voltage is present may cause irreparable damage to the memory modules or system board.

Memory Configurations:

Supports up to 16 GB of DDR3 SDRAM using DIMM modules. Slot 1 is black and must always be populated. Not all memory configurations possible are represented below.

NOTE: For systems configured with more than 3 GB of memory and a 32-bit operating system, all memory may not be available due to system resource requirements. Addressing memory above 4 GB requires a 64-bit operating system.

Total Memory	Socket	
	Channel A	**Channel B**
	1 (black)	2 (black)
2 GB	2 GB	
4 GB	4 GB	
4 GB	2 GB	2 GB
6 GB	4 GB	2 GB
8 GB	8 GB	
8 GB	4 GB	4 GB
16 GB	8 GB	8 GB

Broadcom BCM 57788 Gigabit LAN with Lightning protection (integrated)

Connector	RJ-45
Controller	Broadcom BCM 57788 Netlink Network Adapter
Data rates supported	10/100/1000 Mbps
Compliance	IEEE 802.3, 802.3ab and 802.3u compliant
Bus architecture	Single Channel, PCI-E
Data transfer mode	Bus-master DMA
Data rates supported	10/100/1000 Mbps
Power requirement	Max: 0.8W @ 3.3V. Low: 0.013W @ 3.3V
Boot ROM support	Yes
Network transfer mode	Full-duplex
	Half-duplex (not supported for the 1000BASE-T transceiver
Network transfer rate	10BASE-T (half-duplex) 10 Mbps
	10BASE-T (full-duplex) 20 Mbps
	100BASE-TX (half-duplex) 100 Mbps
	100BASE-TX (full-duplex) 200 Mbps
	1000BASE-T (full-duplex) 2000 Mbps
Environmental	Operating Temperature: 32° to 131°F (0° to 55° C) To 70° C for external regulator
	Operating Humidity: 85% at 131° F (55° C)
Management	WOL, auto MDI crossover, PXE, Muti-port teaming, RSS, Advanced cable diagnostic.
Alerting	ACPI, WOL and DMI 2.0, PXE 2.0, WfM 2.0.

Intel Gigabit CT Desktop Network Interface Controller

Connector	RJ-45
System Interface	PCI Express x1
Controller	Intel WG82574L Gigabit Ethernet Controller
Memory	Integrated Dual 48K configurable transmit receive FIFO Buffers
Data rates supported	10/100/1000 Mbps
Compliance	IEEE 802.1P, 802,1Q, 802.2, 802.3, 802.3AB and 802.3u compliant, 802.3x flow control
Bus architecture	PCI-E 1.0a
Data path width	X1, 250 MB/s, Bi-directional interface
Data transfer mode	Bus-master DMA
Hardware certifications	FCC, B, CE, TUV- cTUVus Mark Canada and United States, TUV- GS Mark for European Union
Power requirement	Aux 3.3V, 3.0 Watts in 1000base-T and 2.0 Watts in 100Base-T
Boot ROM support	Yes

Technical Specifications - Communications

Network Transfer Rate	10BASE-T (half-duplex) 10 Mbps 10BASE-T (full-duplex) 20 Mbps 100BASE-TX (half-duplex) 100 Mbps 100BASE-TX (full-duplex) 200 Mbps 1000BASE-T (full-duplex) 2000 Mbps (actual rate limited by PCI Bus)
Environmental	Operating Temperature: 32° to 131°F (0° to 55° C) Operating Humidity: 85% at 131° F (55° C)
Dimensions	4.75 x 2.25 x 0.8 in (12.1 x 5.7 x 2.0 cm)
Management	WOL, PXE, DMI, WFM 2.0

HP 802.11 b/g/n Wireless Network Connection

Dimensions (L x H)	2.8 x 2.2 in (7.0 x 5.7 cm)
Weight	0.08 lbs (40 g)
Controller	Ralink RT2790
System interface	PCI Express x1
Network standard	802.11 b/g/n
Frequency band	2.400 - 2.497 GHz
Operating temperature	14° to 149°F, operating (-10° to 65°C, operating)
Storage temperature	-40° to 176°F, non-operating (-40° to 80°C, non-operating)
Humidity	10-90% operating 5-95% non-operating
Operating voltage	3.3V +/- 9% 12V +/- 8%

	Platform/WLAN Mode	Power Consumption
Power Consumption	Maximum Power Consumption:	10 Watts
	Transmit Only	4 Watts maximum averaged power over 1 second
	Transmit Packet or Active Scanning	1000 mA peak current for 100 microseconds or longer
	Receive Only Mode or Idle without IEEE PSP mode enabled	3 Watts maximum averaged over 1 second
	Idle, with IEEE PSP mode enabled	1.0 Watts maximum averaged over 1 second
	Transmit Disabled (turned off in software)	50 mW maximum, averaged over 1 second
	Platform in S3 or S4 (power removed from Low Profile PCI Express Card)	5 mW maximum, averaged over 1 second
Output Power (approximate)	802.11b mode	+19 dBm +/- 1.0 dB maximum
	802.11g mode	+17 dBm +/- 1.0 dB maximum
	EWC mode	+17 dBm +/- 1.0 dB maximum (total power in all transmit chains)

Technical Specifications - Communications

	IEEE and WiFi compliant 64 / 128 bit WEP encryption
	AES: CCM
	802.1x authentication
Security	WPA: 802.1x. WPA-PSK and TKIP
	WPA2 certification
	IEEE 802.11i
	Cisco Certified Extensions, all versions through V5
Antenna	HP part number 497317-003
Certifications	Wi-Fi certified
Certifications for use by country	United States, Canada, Peru, Taiwan

High Definition Audio

Type	Integrated
HD Stereo Codec	Realtek 2-channel ALC221 codec
Audio I/O Ports	Front microphone-In (150-K ohm Input Impedance) Rear Line-In/Microphone input (150-K ohm Input Impedance, function is configurable by audio driver) Rear Line-Out* (190 ohms Output Impedance, expects at least a 10-K ohm load) Front Headphone-Out (0.5 Ohm Output Impedance, expects at least a 32 ohm load) Front Microphone/Headphone jack is re-task able to provide Microphone input, line-in or Headphone output to support connecting two headphones to the front of the system. When configured as a second front headphone output, both front headphone outputs are always driven with the same signal. All ports are 3.5mm
Internal Speaker Amplifier	1.5W amplifier for the internal speaker only. External speakers must be powered externally. Rear Line-in audio port is re-taskable as either Line-in or Microphone-In.
Multi-streaming Capable	Multi-streaming can be enabled in the Realtek control panel to allow independent audio streams to be sent to/from the front and rear jacks.
Sampling	8 kHz - 192 kHz
Wavetable Syntheses	Yes – Uses OS soft wavetable
Analog Audio	Yes
# of Channels on Line-Out	Stereo (Left & Right channels)
Internal Speaker	Yes
External Speaker Jack	Yes

HP Thin USB Powered Speakers

On/Off/Volume Controls	Right side of right speaker	
Power LED	Front of right speaker (green)	
Frequency Response	FO to 20kHz	
Watts	2/3 watt (normal/maximum)	
Dimensions/Speaker (H x W x D)	5.72 x 3.74 x 0.96 in 14.52 x 9.50 x 2.45 cm	
Net Weight	0.68 lbs 0.31kg	
Color	Black	
Environmental (all conditions non-condensing)	Operating Temperature:	14° to 104° F (-10° to 40° C)
	Relative Humidity	40% to 90%
Speaker Cable Length	Input Cord:	5.91 ft (1800 mm)
	L-channel Cord:	3.28 ft (1000 mm)
	USB Cord:	5.91 ft (1800 mm)

HP USB Standard Keyboard

Physical characteristics	Keys	104, 105, 106, 107, 109 layout (depending upon country)
	Dimensions (L x W x H)	18.0 x 6.4 x 0.98 in (45.8 x 16.3 x 2.5 cm)
	Weight	2 lb (0.9 kg)
Electrical	Operating voltage	+ 5VDC ± 5%
	Power consumption	50-mA maximum (with three LEDs ON)
	System interface	USB Type A plug connector
	ESD	CE level 4, 15-kV air discharge
	EMI - RFI	Conforms to FCC rules for a Class B computing device
	Microsoft® PC 99 - 2001	Functionally compliant
Mechanical	Languages	38 available
	Keycaps	Low-profile design
	Switch actuation	55-g nominal peak force with tactile feedback
	Switch life	20 million keystrokes (using Hasco modified tester)
	Switch type	Contamination-resistant switch membrane
	Key-leveling mechanisms	For all double-wide and greater-length keys
	Cable length	6 ft (1.8 m)
	Microsoft PC 99 - 2001	Mechanically compliant
Environmental	Acoustics	43-dBA maximum sound pressure level
	Operating temperature	50° to 122° F (10° to 50° C)
	Non-operating temperature	-22° to 140° F (-30° to 60° C)
	Operating humidity	10% to 90% (non-condensing at ambient)
	Non-operating humidity	20% to 80% (non-condensing at ambient)
	Operating shock	40 g, six surfaces
	Non-operating shock	80 g, six surfaces
	Operating vibration	2-g peak acceleration
	Non-operating vibration	4-g peak acceleration
	Drop (out of box)	26 in (66 cm) on carpet, six-drop sequence
	Drop (in box)	42 in (107 cm) on concrete, 16-drop sequence
Approvals	UL, CSA, FCC, CE Mark, TUV, TUV GS, VCCI, BSMI, C-Tick, MIC	

Technical Specifications - Input/Output Devices

Ergonomic compliance	ANSI HFS 100, ISO 9241-4, and TUVGS	
Kit contents	Keyboard	Installation Guide
	Warranty Card	Safety and Comfort Guide

HP PS/2 Standard Keyboard

Physical Characteristics	Keys	104, 105, 106, 107, 109 layout (depending upon country)
	Dimensions (L x W x H)	18.0 x 6.4 x 0.98 in (45.8 x 16.3 x 2.5 cm)
	Weight	2 lb (0.9 kg) minimum
Electrical	Operating voltage	+ 5VDC ± 5%
	Power consumption	50-mA maximum (with three LEDs ON)
	System interface	PS/2 6-pin mini din connector
	ESD	CE level 4, 15-kV air discharge
	EMI - RFI	Conforms to FCC rules for a Class B computing device
	Microsoft PC 99 - 2001	Functionally compliant
Mechanical	Languages	38 available
	Keycaps	Low-profile design
	Switch actuation	55-g nominal peak force with tactile feedback
	Switch life	20 million keystrokes (using Hasco modified tester)
	Switch type	Contamination-resistant switch membrane
	Key-leveling mechanisms	For all double-wide and greater-length keys
	Cable length	6 ft 1.8 m
	Microsoft PC 99 - 2001	Mechanically compliant
Environmental	Acoustics	43-dBA maximum sound pressure level
	Operating temperature	50° to 122° F (10° to 50° C)
	Non-operating temperature	-22° to 140° F (-30° to 60° C)
	Operating humidity	10% to 90% (non-condensing at ambient)
	Non-operating humidity	20% to 80% (non-condensing at ambient)
	Operating shock	40 g, six surfaces
	Non-operating shock	80 g, six surfaces
	Operating vibration	2-g peak acceleration

	Non-operating vibration	4-g peak acceleration
	Drop (out of box)	26 in (66 cm) on carpet, six-drop sequence
	Drop (in box)	42 in (107 cm) on concrete, 16-drop sequence
Approvals	UL, CSA, FCC, CE Mark, TUV, TUV GS, VCCI, BSMI, C-Tick, MIC	
Ergonomic compliance	ANSI HFS 100, ISO 9241-4, and TUVGS	

HP USB PS/2 Washable Keyboard

Introduction:

The HP USB PS2 Washable Keyboard is well-suited for environments that require keyboards to be immersed and cleaned with the following solvents: soap, washing-up liquid, non-abrasive cleaners, general purpose cleaners, bleach, disinfectant, antibacterial cleaners and surgical spirit. The HP USB PS2 Washable Keyboard provides protection against ingress of water and dust to code IP66 defined in IEC (International Electro Technical Commission) standard 60529-1 and code 4X as defined in NEMA (National Electrical Manufacturers Association) standard 250. The code IP66 defined in the IEC standard 60529 means the keyboard is protected against the ingress of dust, and that high pressure water jets from any direction will not have any harmful effects. A NEMA 4X enclosure as defined in NEMA standard 250 will provide protection against windblown dust, rain, splashing water and hose directed water. For additional information on regulatory standards consult your legal department.

NOTE: Observe the manufacturer's instructions for the preparation and use of all cleaning fluids and wear the appropriate protective clothing.

WARNING: To reduce the risk of electric shock, avoid using the keyboard with a computer in wet locations.

Key Benefits	• SpillSeal® keyboard technology protection; provides protection from liquids and dust as defined in IEC standard 60529-1, code IP66, and NEMA standard 250, code 4X • Sealed structure able to be fully washed under running water (If the USB plug [connector] gets wet, shake dry before reconnecting.) • Waterproof exterior that protects against windblown dust, rain, splashing water and hose-directed water • USB extension cable allows the keyboard to be easily disconnected without having to access the computer • Plug and play capability when using supported Microsoft Windows operating systems. No additional software drivers are required • USB or PS2 connection • User selectable, zero degree slope for potential wrist posture improvement and associated usage comfort • Key mechanism lifecycle rated at 10 million keystrokes
Compatibility	The HP USB/PS2 Washable Keyboard is compatible with all HP Compaq Business PCs
Service and Support	Your Option Limited Warranty is a one (1) year (HP Option Limited Warranty Period) parts replacement warranty on any HP-branded or Compaq-branded options (HP Options). If your HP Option is installed in an HP Hardware Product, HP may provide warranty service either for the HP Option Limited Warranty Period or the remaining Limited Warranty Period of the HP Hardware Product in which the HP Option is being installed, whichever period is the longer but not to exceed three (3) years from the date you purchased the HP Option.

Technical Specifications - Input/Output Devices

	Keys	104 (US) layout or 105 (EU) layout (depending upon country)
Physical Characteristics	Dimensions (L x W x H)	17.67 x 6.62 x 1.38 in 449 x 168 x 35 mm
	Weight	1.7 lb 0.77 kg minimum
Electrical	Operating voltage	+ 5VDC ±5%
	Power consumption	50-mA maximum (with three LEDs ON)
	System interface	USB Type A plug connector
	ESD	CE level 4, 15-kV air discharge
	EMI - RFI	Conforms to FCC rules for a Class B computing device
	Microsoft® PC 99 - 2001	Functionally compliant
Mechanical	Keycaps	Stepped -profile design
	Switch actuation	55-g nominal peak force with tactile feedback
	Switch life	20 million keystrokes
	Switch type	Contamination-resistant switch membrane
	Key-leveling mechanisms	For all double-wide and greater-length keys
	Cable length	7 ft 2.2 m
	Microsoft PC 99 - 2001	Mechanically compliant
Environmental	Acoustics	43-dBA maximum sound pressure level
	Operating temperature	50° to 122° F (10° to 50° C)
	Non-operating temperature	-22° to 140° F (-30° to 60° C)
	Operating humidity	10% to 95% (non-condensing at ambient)
	Non-operating humidity	0% to 95% (non-condensing at ambient)
	Operating shock	40 g, six surfaces
	Non-operating shock	80 g, six surfaces
	Operating vibration	2-g peak acceleration
	Non-operating vibration	4-g peak acceleration
	Drop (out of box)	26 in (66 cm) on carpet, six-drop sequence
	Drop (in box)	42 in (107 cm) on concrete, 16-drop sequence
Approvals	UL, cUL, FCC, CE, TUV GS, VCCI, BSMI, C-Tick, KCC, USB-IF, WHQL, EN/IEC 60601-1, IP66/NEMA4X	
Ergonomic compliance	ANSI HFS 100, ISO 9241-4, and TUVGS	

Kit contents	Keyboard with USB cable, USB-to_PS2 adapter, Quick disconnect cable with extension to lengthen your cable, I/O Security Software & Documentation CD including the safety and comfort guide, warranty card

HP USB Smart Card (CCID) Keyboard

Introduction:

Boost your security, simplify access procedures and reduce the costs associated with managing networks by preventing unauthorized access to your computers and networks using smartcard technology with the HP Smart Card (CCID) Keyboard.

The USB Smart Card (CCID) Keyboard is a full-sized keyboard that takes advantage of digital signatures and certificates to secure the environment for transactions performed on both public and private networks. The USB Smart Card (CCID) Keyboard works with all smart cards that comply with ISO standard 7816.

Smart cards are easy-to-use credit card-sized devices which require multiple forms of information to be validated before you gain access to your accounts or resources. Used worldwide, smart cards strengthen access to a network or other resource using dual-factor authentication. Implementing a two-factor authentication (or multi-factor authentication) process reduces the risk of unauthorized access by verifying and validating your identity in one of the following ways:

- Something you know – a combination of username and password or PIN
- Something you have – a smart card or security token.

Something you have (smart card) plus something you know (PIN), improves user-access security within corporate network environments. Smart cards are used in government agencies, healthcare companies and the finance industry.

HP Client Security Smart Card Manager provides authentication software for the smart card. The Smart Card Reader module works with the HP Client Security Manager and enables the user to setup, use, and manage the smart card. This allows strengthened security with HP patented technology.

Key Benefits:

- Protects against unauthorized access with smart card technology
- Delivers even greater security when combined with a HP Client Security smart card and the HP Client Security Software
- Combination of username and password or pin with a smart card or security token
- Secures online transactions using digital signatures and certificates
- Conforms to industry standards for ease of setup and use
- Delivers long product life and quiet operation with high-impact materials and lubricated keys
- Spill drain feature

Physical Characteristics	Keys	104, 105, 106, 107, 109 layout (depending upon country
	Form factor	USB basic smart card keyboard
	Colors	Carbonite/Silver
	Dimensions (H x W x D)	18.2 x 6.3 x 1.3 in 46.3 x 16.1 x 3.3 cm
	Weight	2 lb (0.9 kg) minimum
	Operating voltage	+ 5VDC ± 5%
	Power consumption	100-mA maximum (with four LEDs ON)

Technical Specifications - Input/Output Devices

Electrical	System interface	USB Type A plug connector	
	ESD	CE level 4, 15-kV air discharge	
	EMI - RFI	Conforms to FCC rules for a Class B computing device	
	Microsoft PC 99 - 2001	Functionally compliant	
Mechanical	Languages	30+ available	
	Keycaps	Standard design	
	Switch actuation	55 g nominal peak force with tactile feedback	
	Switch life	20 million keystrokes (using Hasco modified tester)	
	Switch type	Contamination-resistant membrane	
	Key-leveling mechanisms	For all double-wide and greater-length keys	
	Cable length	6 ft (1.8 m)	
	Microsoft PC 99 - 2001	Mechanically compliant	
Environmental	Acoustics	43-dBA maximum sound pressure level	
	Operating temperature	50° to 122° F (10° to 50° C)	
	Non-operating temperature	-22° to 140° F (-30° to 60° C)	
	Operating humidity	10% to 90% (non-condensing at ambient)	
	Non-operating humidity	20% to 80% (non-condensing at ambient)	
	Operating shock	40 g, six surfaces	
	Non-operating shock	80 g, six surfaces	
	Operating vibration	2-g peak acceleration	
	Non-operating vibration	4-g peak acceleration	
	Drop (out of box)	26 in (66 cm) on carpet, six-drop sequence	
	Drop (in box)	42 in (107 cm) on concrete, 16-drop sequence	
SmartCard Function	Support	All ISO 7816 smart cards	
	Interface	Reads from and writes to all ISO7816-1, 2, 3, 4 memory and microprocessor smart cards (T=0, T=1)	
	Chipset	SCM STCIII	
	Standard APIs supported	PC/SC, EMV2000, CT-API	
	Power	USB Port	
		Short circuit detection (protects smart card and reader)	
		Power supply compliant with ISO7816 and EMV (5V, 60 mA)	
		Supports 3-V and 5-V cards	
	Power consumption	100-mA maximum draw	
	Communication	From card	9600 bps to 330,000 bps
		From computer	12 Mbps (USB transfer speed)
	Landing mechanism	Contact device	Friction contact
		Card insertions rating	Up to 100,000 insertion cycles
	Interface modes	CCID protocol	
	Reader performance interface	USB connection	

	Electro-magnetic standards	Europe	2004/108/EC
		USA	USAFCC part 15
Approvals	CE-Mark, UL, CSA, FCC, CE Mark, TUV, TUV GS, VCCI, BSMI, C-Tick, MIC, EMV2000, USB-IF		
Ergonomic Compliance	ISO 9241-4, TUVGS		
Kit Contents	Keyboard, I/O Security and Documentation CD, warranty card		

HP Wireless Keyboard and Mouse

Keyboard	Dimensions (H x L x W)	1.47 x 18.06 x 6.43 in (37.3 x 458.8 x 163.2 mm)
	Weight – Without Two AA Alkaline Batteries	Weight - Without Two AA Alkaline Batteries 1.96 lb (890 g)
Mouse	Dimensions (H x L x W)	1.51 x 4.69 x 2.71 in (38.4 x 119 x 68.9 mm)
	Weight – Without Two AA Alkaline Batteries	0.17 lb (80 g)
Receiver	Dimensions (H x L x W)	0.31 x 0.72 x 2.24 in (8 x 18.4 x 57 mm)
	Weight	0.27 oz (7.6 g)
	Cable Length – Minimum	6 ft (1.8 m)
	Range	32.8 ft (10 m)
System Requirements	Windows 7 Home Basic*, Windows 7 Home Premium*, Windows 7 Professional Edition 32*, Windows 7 Professional Edition 64*, Windows 7 Ultimate Edition 32*, Windows 7 Ultimate Edition 64* Windows Vista or Windows XP Available USB port for the receiver CD-ROM Drive *This system may require upgraded and/or separately purchased hardware and/or a DVD drive to install the Windows 7 software and take full advantage of Windows 7 functionality. See http://www.microsoft.com/windows/windows-7/ for details.	
	Product Safety	UL; CSA /TUV (Europe only); CE Mark
	Ergonomics	ANSI; ISO (Europe only); GS Mark (Germany only)
	EMC	FCC; CISPR; ACA; BSMI; MIC; VCCI
	CE Mark	EN 55022:1998; EN 55024
	Design Guidelines for PCs	PC 99 - connector overmold colors; PC 2001 - full functionality
	Telecom	All local telecom requirements and approvals for intended markets
	USA	FCC Part 15 Equipment Certificate; CFR 47, Part 15; other local requirements
	Country Support	US, Belgium, Switzerland, Spain, Denmark, Netherlands, France, Germany, Italy, Portugal, Sweden, Norway, Finland, UK, Poland, Czech Republic, Turkey, Greece, Austria,

		Bulgaria, Cyprus, Estonia, Hungary, Ireland, Latvia, Lithuania, Luxemburg, Malta, Romania, Slovakia, Slovenia, Vietnam, HK, Australia, NZ, Malaysia, Singapore, Indonesia, Philippines, and Thailand.
Environmental	Keyboard contains 25% post-consumer recycled plastic material.	

HP PS/2 Optical Mouse

Dimensions (H x L x W)	1.56 x 2.44 x 4.61 in (3.95 x 6.21 x 11.7 cm)	
Weight	4.44 oz (126 g)	
Environmental	Operating temperature	-32° to 104°F (0° to 40° C)
	Non-operating temperature	-4° to 140°F (-20° to 60° C)
	Operating humidity	10% to 90% (non condensing at ambient)
	Non-operating humidity	10% to 90% (non condensing at ambient)
Electrical	Operating shock	40 g, 6 surfaces
	Non-operating shock	80 g, 6 surfaces
	Operating vibration	2 g peak acceleration
	Non-operating vibration	4 g peak acceleration
	Drop (out of box)	80 cm height onto asphalt tile over concrete or equivalent, 5-drop in 5 direction except the cable face
	Operating voltage	5 VDC ± 10%
	Power consumption	100mA
	System consumption	PS/2 mini-din connector
	ESD	CE level 4, 15 kV air discharge
	EMI-RFI	Conforms to FCC rules for a Class B computing device
Mechanical	Microsoft PC99 - 2001	Functionally compliant
	Resolution	400 ± 20% DPI
	Tracking speed	10 in/s (25.4 cm/s) maximum
	Acceleration	100 in/s/s (2.54 m/s/s)
	Switch actuation	61 g nominal peak force
	Switch life	3,000,000 operations (using Hasco modified tester)
	Switch type	Low force micro-switches

	Tracking mechanism life	155 mi (250 km) at average speed of 10 in/s
	Cable length	6 ft (1.8 m)
	Microsoft PC99 - 2001	Mechanically compliant
Scroll wheel	Width	8 mm
	Diameter	1.01 in (25.6 mm)
	Maximum rotation speed	48 rats/sec
	Switch type	Light force micro-switch
	Switch life	1 million operations
	Mechanical life	Minimum 200,000 revolutions
Regulatory Approvals	UL, CSA, FCC, CE Mark, TUV, TUV GS, VCCI, BSMI, C-Tick, MIC	

HP USB Optical Mouse

Dimensions (H x L x W)	1.5 x 4.5 x 2.5 in (3.8 x 11.6 x 6.3 cm)
Weight	0.27 lb (0.12 kg)
Cable length	72.8 in (185 cm)
System requirements	Available USB port

HP USB PS/2 Washable Mouse

The HP USB PS2 Washable Mouse is a USB based mouse that is designed to be taken apart (disassembled), when it becomes soiled, or in the event that something is spilled on it. The mouse can to be immersed for cleaning with the following solvents: soap, washing-up liquid, non-abrasive cleaners, general purpose cleaners, bleach, disinfectant, antibacterial cleaners and surgical spirit. The HP USB PS2 Washable Mouse provides protection against ingress of water and dust to code IP66 defined in IEC (International Electro Technical Commission) standard 60529-1 and code 4X as defined in NEMA (National Electrical Manufacturers Association) standard 250. The code IP66 defined in the IEC standard 60529 means the mouse is protected against the ingress of dust, and that high pressure water jets from any direction will not have any harmful effects. A NEMA 4X enclosure as defined in NEMA standard 250 will provide protection against windblown dust, rain, splashing water and hose directed water. For additional information on regulatory standards consult your legal department.

NOTE: Observe the manufacturer's instructions for the preparation and use of all cleaning fluids and wear the appropriate protective clothing.

WARNING: To reduce the risk of electric shock, avoid using the keyboard with a computer in wet locations.

Key Benefits

- Sealed structure able to be fully washed under running water
- Waterproof exterior that protects against windblown dust, rain, splashing water, hose-directed water, and damage from external ice formation
- Removable scroll wheel that clips back into place after cleaning

Technical Specifications - Input/Output Devices

- SpillSeal® mouse technology protection, which provides protection from liquids and dust as defined in IEC standard 60529-1, code IP66, and NEMA standard 250, code 4X
- Plug and play capability when using supported Microsoft Windows operating systems. No additional software drivers are required
- USB or PS2 connection
- Optical tracking with two standard buttons and a third button located in the center for highlighting information or autoscrolling

Compatibility	The HP USB/PS2 Washable Mouse is compatible with all HP Compaq Business PCs	
Service and Support	Your Option Limited Warranty is a one (1) year (HP Option Limited Warranty Period) parts replacement warranty on any HP-branded or Compaq-branded options (HP Options). If your HP Option is installed in an HP Hardware Product, HP may provide warranty service either for the HP Option Limited Warranty Period or the remaining Limited Warranty Period of the HP Hardware Product in which the HP Option is being installed, whichever period is the longer but not to exceed three (3) years from the date you purchased the HP Option.	
Dimensions (H x L x W)	1.56 x 2.44 x 4.61 in 3.95 x 6.21 x 11.7 cm	
Weight	4.44 oz 126g	
Electrical	Operating voltage	5 VDC ± 10%
	Power consumption	100mA
	System consumption	PS/2 mini-din connector or USB
	ESD	CE level 2 8 kV air discharge
	EMI-RFI	Conforms to FCC rules for a Class B computing device
	Microsoft® PC99 – 2001	Functionally compliant
Mechanical	Resolution	1000 ± 20% DPI
	Tracking speed	14 in/s (35.56 cm/s) maximum
	Acceleration	2 g
	Switch actuation	70 g nominal peak force
	Switch life	3,000,000 operations (using Hasco modified tester)
	Switch type	Low force micro-switches
	Cable length	8.8 ft total 70 cm+ 2m extension
	Microsoft PC99 – 2001	Mechanically compliant
Environmental	Operating temperature	–32° to 104°F (0° to 40° C)
	Non-operating temperature	–4° to 140°F (–20° to 60° C)
	Operating humidity	10% to 90% (non-condensing at ambient)
	Non-operating humidity	10% to 90% non-condensing
	Operating shock	40 g, 6 surfaces
	Non-operating shock	80 g, 6 surfaces
	Operating vibration	2 g peak acceleration
	Non-operating vibration	4 g peak acceleration
	Drop (out of box)	80 cm height onto asphalt tile over concrete or equivalent, 5-drop in 5 direction except the cable face
Scroll wheel	Width	6 mm
	Diameter	1 in (25.4 mm)

	Maximum rotation speed	48 rats/sec
	Switch type	Light force micro-switch
	Switch life	3 million operations
	Mechanical life	Minimum 200,000 revolutions
Regulatory approvals	Compliant	FCC, CE Mark, ICES-003-B, IP66/NEMA4X
Compatibility	Operating system support	Windows Vista Business 64, Windows Vista Business 32, Windows Vista Home Basic 32, Windows 2000, Windows XP Professional or Windows XP Home 32 (No driver is required for this device. Native support is provided by the operating system.), xpe, ce.net, Linux, XP-64

HP USB Laser Mouse

Scroll Wheel	24	
Maximum Rotation Speed	48 rats/sec	
Switch Type	Wheel	
Switch Life	Button - 3,000,000	
	Wheel - 1,000,000 times	
	Tilt switch - 500,000 times	
Environmental	Operating Temperature	32° to 104° F (0° to 40° C)
	Non-operating Temperature	-4° to 140° F (-20° to 60° C)
	Operating Humidity	10% to 90% (non-condensing at ambient)
	Non-operating Humidity	20% to 80% (non-condensing at ambient)
	Operating Shock	40 g, six surfaces
	Non-operating Shock	80 g, six surfaces
	Operating Vibration	2-g peak acceleration
	Non-operating Vibration	4-g peak acceleration
Electrical	Operating Voltage	+ 5VDC ± 5%
	Power Consumption	
	MTBF	> 150,000 hrs
	ESD	IEC-61000-4-2 criteria B, Contact discharge: +/- 4kV, Air discharge: +/- 8kV
	EMI-RFI	FCC Class B
	PC98	PC 99 Compliant
Mechanical	Resolution	800dpi

Technical Specifications - Input/Output Devices

	Tracking Speed	25 cm/sec
	Acceleration	0.5mm
	Switch Actuation	0.6N (60gf)
	Switch Life	Button - 3,000,000
		Wheel - 1,000,000 times
		Tilt switch - 500,000 times
	Cable Length	1850mm
	PC98-99	PC99 compliant
Regulatory Approvals	UL60950-1, UL 94, UL 746 (A-E), UL 796 TUV/GS: EN 60950-1, EN 60825-1 FCC Class B, UL 1950, cUL, TUV GS, CE, C-tick, VCCI, BSMI, RRL	

Unit Environment and Operating Conditions

General Unit Operating Guidelines

- Keep the computer away from excessive moisture, direct moisture and the extremes of heat and cold, to ensure that unit is operated within the specified operating range.
- Leave a 10.2 cm (4 in) clearance on all vented sides of the computer to permit the required airflow.
- Never restrict airflow into the computer by blocking any vents or air intakes.
- Do not stack computers on top of each other or place computers so near each other that they are subject to each other's re-circulated or preheated air.
- Occasionally clean the air vents on the front, back, and any other vented side of the computer. Lint, dust and other foreign matter can block the vents and limit the airflow.
- If the computer is to be operated within a separate enclosure, intake and exhaust ventilation must be provided on the enclosure, and the same operating guidelines listed above will still apply.

Temperature Range	Operating: 50° to 95° F (10° to 35° C)* Non-operating: –22° to 140° F(–30° to 60° C)
Relative Humidity	Operating: 10% to 90% (non-condensing at ambient) Non-operating: 5% to 95% (non-condensing at ambient)
Maximum Altitude (unpressurized)	Operating: 10,000 ft (3048 m) Non-operating: 30,000 ft (9144 m)

*Operating temperature is de-rated 1.0 deg C per 300 m (1000 ft) to 3000 m (10,000 ft) above sea level, no direct sustained sunlight. Maximum rate of change is 10 deg C/Hr. The upper limit may be limited by the type and number of options installed.

Power Supply

Standard Efficiency	240W active PFC 70% @ 100% load	
High Efficiency	240W active PFC 82/85/82% @ 20/50/100% load	
Max Power Rating	240W	
Power Factor Correcting (PFC)	Active	
Rated Line Frequency	50/60 Hz	
Operating Line Frequency Range	47 – 63 Hz	
Maximum Voltage Range	115 VAC:	90 - 140 VAC
	220VAC:	180 - 264 VAC
Nominal Voltage Range	115 VAC:	100 - 127 VAC
	220VAC:	200 - 240 VAC
Rated Input Current	≤4A	
Maximum allowable leakage Current (NFPA 99)	275 µA	
Power Supply Fan	92mm variable speed	

*High efficiency power supply is a requirement for ENERGY STAR qualification in conjunction with a select range of processors and modules

Serviceability Features

- Dual colored power LED on front of computer to indicate either normal or fault condition
- Diagnostic LED Explanation Table:
  - Number of 1-second red LED blinks followed by a 2-second pause, then repeats:
    - 2 - processor thermal protection activated
    - 3 - processor not installed
    - 4 - power supply failure
    - 5 -- memory error
    - 6 - video error
    - 7 - PCA failure (ROM detected failure prior to video)
    - 8 - invalid ROM, bootblock recovery mode
    - 9 - system not fetching code
    - 10 - system hang while loading an option ROM
- System/Emergency ROM
- Flash ROM
- CMOS Battery Holder for easy replacement
- Flash Recovery with Video Configuration Record Software
- 5 Aux Power LED on System PCA
- Processor ZIF Socket for easy Upgrade
- Over-Temp Warning on Screen (Requires IM Agents)
- Clear Password Jumper
- DIMM Connectors for easy Upgrade
- Clear CMOS Button
- NIC LEDs (integrated) (Green & Amber)
- Dual Color Power and HD LED - To Indicate Normal Operations and Fault Conditions
- Color coordinated cables and connectors
- Tool-less Hood Removal
- Front power switch
- System memory can be upgraded without removing the system board or any internal components
- Tool-less Hard Drive, CD & Diskette Removal
- Green Pull Tabs, and Quick Release Latches for easy Identification

Additional Features

	Description
ASF 2.0 support (Alert Standard Format)	Industry-standard specification for network alerting in operating system-absent environments
Computrace	Computrace agent support standard
Towerable Orientation	Product can be oriented as either a desktop or a tower
Drive Lock	Implementation of the industry standard ATA Security feature set. When enabled, it prevents software access to user data on the drive until one or two user-defined passwords are provided. DPS Access through F10 Setup during Boot
Drive Protection System	A diagnostic hard drive self test. It scans critical physical components and every sector of the hard drive for physical faults and then reports any faults to the user Running independently of the operating system, it can be accessed through a Windows-based diagnostics utility or through the computer's setup procedure. It produces an evaluation on whether the hard drive is the source of the problem and needs to be replaced

Technical Specifications – Miscellaneous Features

	The system expands on the Self-Monitoring, Analysis, and Reporting Technology (SMART), a continuously running systems diagnostic that alerts the user to certain types of failures
SMART Technology (Self-Monitoring, Analysis and Reporting Technology)	Allows hard drives to monitor their own health and to raise flags if imminent failures were predicted
SMART I - Drive Failure Prediction	Predicts failures before they occur. Tracks fault prediction and failure indication parameters such as re-allocated sector count, spin retry count, calibration retry count
SMART II - Off-Line Data Collection	By avoiding actual hard drive failures, SMART hard drives act as "insurance" against unplanned user downtime and potential data loss from hard drive failure
SMART III - Off-Line Read Scanning with Defect Reallocation	IOEDC: I/O Error Detection Circuitry
SMART IV - End-to-End CRC for hard drives	Detects errors in Read/Write buffers on HDD cache RAM Interface in F10 setup provides confirmation of SMART IV support.

Technical Specifications - Environmental Data

Eco-Label Certifications & declarations

This product series has received or is in the process of being certified to the following approvals and may be labeled with one or more of these marks:

- US ENERGY STAR ®
- IT ECO declaration
- EPEAT Gold where HP registers commercial desktop products. See http://www.epeat.net for registration status in your country

System Configuration

The configuration used for the Energy Consumption and Declared Noise Emissions data for the Small Form Factor Desktop model is based on a typically configured product.

Energy Consumption

115 VAC	230 VAC	100 VAC
39.02 W	38.59 W	39.27 W
2.26 W	2.43 W	2.26 W
0.86 W	1.01 W	0.85 W

Note: Energy efficiency data listed is for an ENERGY STAR® compliant product if offered within the model family . HP computers marked with the ENERGY STAR® Logo are compliant with the applicable U.S. Environmental Protection Agency (EPA) ENERGY STAR® specifications for computers. If a model family does not offer ENERGY STAR® compliant configurations, then energy efficiency data listed is for a typically configured model.

Heat Dissipation*

115 VAC	230 VAC	100 VAC
133 BTU/hr	132 BTU/hr	134 BTU/hr
8 BTU/hr	8 BTU/hr	8 BTU/hr
3 BTU/hr	3 BTU/hr	3 BTU/hr

***NOTE:** Heat dissipation is calculated based on the measured watts, assuming the service level is attained for one hour.

Declared Noise Emissions (in accordance with ISO 7779 and ISO 9296) (Typically configured)	Sound Power (LWAd, bels	Sound Pressure (LpAm, decibels)
Idle	3.7	30
Fixed Disk (random writes)	4	32

Longevity and Upgrading

This product can be upgraded, possibly extending its useful life by several years. Spare parts are available throughout the warranty period and or for up to "5" years after the end of production.

Battery

The battery(s) in this product complies with EU Directive 2006/66/EC, and does not contain: 540

- Mercury greater the 5ppm by weight
- Cadmium greater than 10ppm by weight

Battery Size

CR2032 (coin cell)

Battery Type

Lithium

Additional Information

This product is in compliance with the Restrictions of Hazardous Substances (RoHS) directive - 2002/95/EC.
This HP product is designed to comply with the Waste Electrical and Electronic Equipment (WEEE) Directive - 2002/96/EC.
This product is in compliance with California Proposition 65 (State of California; Safe

Drinking Water and Toxic Enforcement Act of 1986).
This product is in compliance with the IEEE 1680 (EPEAT) standard at the Gold level where HP registers commercial desktop products. See http://www.epeat.net for registration status in your country.Plastics parts weighing over 25 grams used in the product are marked per ISO 11469 and ISO1043.
This product contains 0% post-consumer recycled plastic (by wt.)
This product is 93.9% recyclable when properly disposed of at end of life.

Packaging Materials

External	Paper Corrugated - 2300 g
Internal	PLASTIC/EPS (Expanded Polystyrene) - 63.4 g PLASTIC/Polyethylene low density - 56 g PLASTIC/Polypropylene - 15 g

The PAPER/Corrugated packaging material contains at least 30.66% recycled content.
The PLASTIC/EPS (Expanded Polystyrene) packaging material contains at least 5% recycled content.
The PLASTIC/Polyethylene low density packaging material contains at least 5% recycled content.
The PLASTIC/Polypropylene packaging material contains at least 5% recycled content.

RoHS Compliance

Hewlett-Packard is committed to compliance with all applicable environmental laws and regulations, including the European Union Restriction of Hazardous Substances (RoHS) Directive. HP's goal is to exceed compliance obligations by meeting the requirements of the RoHS Directive on a worldwide basis. By July 1, 2006, RoHS substances will be virtually eliminated (virtually = to levels below legal limits) for all HP electronic products subject to the RoHS Directive, except where it is widely recognized that there is no technically feasible alternative (as indicated by an exemption under the EU RoHS Directive).

Material Usage

This product does not contain any of the following substances in excess of regulatory limits (refer to the HP General Specification for the Environment at: http://www.hp.com/hpinfo/globalcitizenship/environment/supplychain/gen_specifications.html):

- Asbestos
- Certain Azo Colorants
- Certain Brominated Flame Retardants - may not be used as flame retardants in plastics
- Cadmium
- Chlorinated Hydrocarbons
- Chlorinated Paraffins
- Formaldehyde
- Halogenated Diphenyl Methanes
- Lead carbonates and sulfates
- Lead and Lead compounds
- Mercuric Oxide Batteries
- Ozone Depleting Substances
- Polybrominated Biphenyls (PBBs)
- Polybrominated Biphenyl Ethers (PBBEs)
- Polybrominated Biphenyl Oxides (PBBOs)
- Polychlorinated Biphenyl (PCB)
- Polychlorinated Terphenyls (PCT)
- Polyvinyl Chloride (PVC) - except for wires and cables, and certain retail packaging has been voluntarily removed from most applications.
- Radioactive Substances
-
-

- Tributyl Tin (TBT), Triphenyl Tin (TPT), Tributyl Tin Oxide (TBTO)
- Nickel finishes that release greater than 0.5 micro-grams/cm^2/week, measured according to EN 1811:1998, are not used on any product surface designed to be frequently handled or touched by users.

Packaging

HP follows these guidelines to decrease the environmental impact of product packaging:

- Eliminate the use of heavy metals such as lead, chromium, mercury and cadmium in packaging materials.
- Eliminate the use of ozone-depleting substances (ODS) in packaging materials.
- Design packaging materials for ease of disassembly.
- Maximize the use of post-consumer recycled content materials in packaging materials.
- Use readily recyclable packaging materials such as paper and corrugated materials.
- Reduce size and weight of packages to improve transportation fuel efficiency.
- Plastic packaging materials are marked according to ISO 11469 and DIN 6120 standards.

End-of-life Management and Recycling

Hewlett-Packard offers end-of-life HP product return and recycling programs in many geographic areas. To recycle your product, please go to: http://www.hp.com/go/reuse-recycle or contact your nearest HP sales office. Products returned to HP will be recycled, recovered or disposed of in a responsible manner.

The EU WEEE directive (2002/95/EC) requires manufacturers to provide treatment information for each product type for use by treatment facilities. This information (product disassembly instructions) is posted on the Hewlett Packard web site at: http://www.hp.com/go/recyclers. These instructions may be used by recyclers and other WEEE treatment facilities as well as HP OEM customers who integrate and re-sell HP equipment.

Hewlett-Packard Corporate Environmental Information

For more information about HP's commitment to the environment:
Global Citizenship Report
http://www.hp.com/hpinfo/globalcitizenship/gcreport/index.html
Eco-label certifications
http://www.hp.com/hpinfo/globalcitizenship/environment/productdesign/ecolabels.html
ISO 14001 certificates:
http://www.hp.com/hpinfo/globalcitizenship/environment/operations/envmanagement.html

After-Market Options (availability may vary by region)

Communication Devices

	Part Number
Intel Pro 1000 CT2 Gigabit NIC (PCIe x1)	FH969AA
Broadcom NetXtreme GbE Ethernet Plus NIC (PCIe x1)	FS215AA
HP Wireless 802.11 b/g/n NIC (PCIe x1)	FH971AA

Graphics Solutions

	Part Number
AMD Radeon HD 6350 Graphics (PCIe x16)	QK638AA
AMD Radeon HD 7450 Graphics	B1R44AA
Nvidia NVS 300 Graphics (PCIe x16)	BV456AA
Nvidia NVS 310 Graphics (PCIe x16)	A7U59AA
Adapters & Cables	
HP DisplayPort Cable Kit	VN567AA
HP DisplayPort To Dual Link DVI-D Adapter	NR078AA
HP DisplayPort To DVI-D Adapter	FH973AA
HP DisplayPort to HDMI Adapter	BP937AA
HP DisplayPort to VGA Adapter	AS615AA
HP DMS-59 to Dual DVI Cable	DL139A
HP DMS-59 to Dual DisplayPort Adapter	XP688AA
HP DVI Cable Kit	DL198AT
HP USB Graphics Adapter	NL571AA

Data Storage Drives and Accessories

	Part Number
HP 128 GB SATA Solid State Drive	QV063AA
HP 500-GB 7.2K rpm SATA 6.0Gb/s 3.5" Hard Disk Drive	QK554AA
HP 1-TB 7.2K rpm SATA 6.0Gb/s 3.5” Hard Disk Drive	QK555AA

Optical Drives

	Part Number
HP 16X SATA DVD-ROM JB Drive	AR629AA
HP Blu-ray BDXL SATA Drive	AR482AA
HP SATA SuperMulti JB Drive	QS208AA

After-Market Options (availability may vary by region)

Input Devices

	Part Number
HP PS/2 Standard Keyboard	DT527A
HP USB Standard Keyboard	DT528A
HP USB Grey Keyboard	B6B64AA
HP USB Keyboard and Mouse Kit	RC465AA
HP USB Washable Keyboard	VF097AA
HP USB and PS/2 Washable Mouse	BM866AA
HP USB and PS/2 Washable Keyboard and Mouse Kit	BU207AA
HP Wireless Keyboard and Mouse (Keyboard contains 25% post-consumer recycled plastic material)	QY449AA
HP PS/2 Optical Mouse	EY703AA
HP USB Optical Mouse	DC172AT
HP USB Laser Mouse	GW405AT
HP Mouse Pad	AT485AA

System Memory

	Part Number
HP 2GB DDR3-1600 (PC3-12800) DIMM	B4U35AA
HP 4GB DDR3-1600 (PC3-12800) DIMM	B4U36AA
HP 8GB DDR3-1600 (PC3-12800) DIMM	B4U37AA

Multimedia Devices

	Part Number
HP Thin USB Powered Speakers	KK912AA
HP USB HD 720P Business Webcam	QP896AA
HP Business Headset	QK550AA

Removable Media Storage

	Part Number
HP 22-n-1 Media Card Reader	AR941AA

Security Devices

	Part Number
HP Business PC Security Lock	PV606AA
HP SFF Wall Mount/Security Sleeve	VN570AA
HP Chassis Security Kit	AR639AA
HP Keyed Security Kit	BV411AA

After-Market Options (availability may vary by region)

Stands and Accessories

	Part Number
HP Integrated Work Center Stand (SFF)	QP897AA
HP SFF Tower Stand	VN569AA
HP Serial Port Adapter (RS-232 compatible	PA716A
HP Parallel Port Adapter	KD061AA
Belkin USB to Serial Adapter	EM449AA
Belkin 7-Outlet Surge Protector	AG290AA
Belkin Cat5e Patch Cable	AH122AA
Belkin Firewire (1394) Cable	AH123AA

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